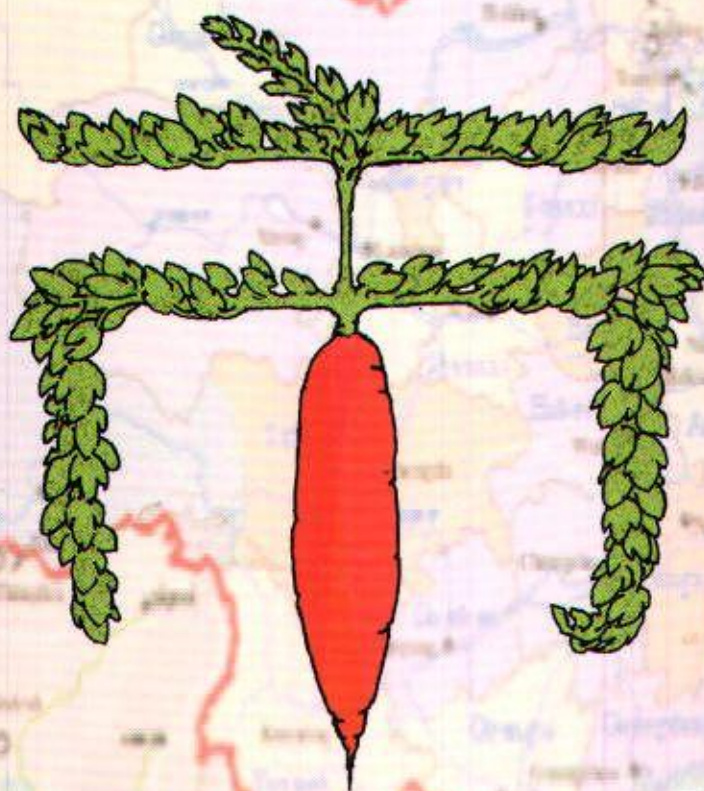# Agricultural Marketing in a Country in Transition

Case of Sweetpotato Products in Sichuan P. R. China

Xiaoyong Zhang

Propositions (Stellingen)

1 Understanding consumers' wants and needs is only a first step in the evolution of marketing in a transitional economy, most important is whether and how the market system can respond to that understanding. (this dissertation).

2. In centrally planned economies, the government was the main player in agricultural markets. The new task of the government in the transitional period should be to define the rule of the game, such as contract laws, and to facilitate marketers in the channel in playing the game.(this dissertation)

3. Market Orientation is a leading principle in organising marketing by companies, it also serves as a guiding concept for transforming marketing in the transition from a centrally planned economy toward a market economy. (this dissertation)

4. Services such as packaging and availability have become important in marketing sweetpotato products as a basic food in China. (this dissertation)

5.TheGovernment can stimulate an efficient integration of sweetpotato farmers in the market by improving infrastructure and by educational programmes. (this dissertation)

6. Deng Xiaoping's statement in 1992 'We should be bolder than before in conducting reform and opening to the outside and have the courage to experiment. We must not act like women with bound feet' has been widely implemented in the marketing of sweetpotato industry in China, such as the organisation of wholesale markets, marketing co-operatives.

7. Deng Xiaoping's famous statement in the earlier 1960s: 'It does not matter if a cat is white or black, as long as it catches mice' appeared to be relevant in the development of China's agriculture sector, e.g. the successful transformation of collective farming to Household Responsibility System.

8. If you are doing marketing research in Sichuan, you will share the opinion as Li Bai had a thousand years ago "Travelling to Sichuan is more difficult than travelling to Heaven' --Li Bai (701-762, Tang Dynasty)

9. The more you try to learn Dutch, the more the Dutch refuse to speak Dutch to you and the more they complain that you have not learned it. (Colin White & Laurie Boucke, The UnDutchables)

Propositions presented with the doctoral dissertation entitled 'Agricultural Marketing in a Country in Transition: Case of Sweetpotato Products in Sichuan, P. R. China' by Xiaoyong Zhang, September, 1999.

Agricultural Marketing

in a Country in Transition

Case of Sweetpotato Products in Sichuan, P. R. China

Agricultural Marketing
in a Country in Transition

Case of Sweetpotato Products in Sichuan, P. R. China

Xiaoyong Zhang

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF BOXES

Acronyms and Abbreviations

CAAS:	Chinese Academy of Agricultural Sciences
CCAP:	Center for Chinese Agricultural Policy, CAAS.
CIAD:	Center for Integrated Agricultural Development, China Agricultural Universtiy.
CIAT:	Centro Internacional de Agricultura Tropical
CIP:	International Potato Center
GB:	Grain Bureau, P. R. China
MOA:	Ministry of Agriculture, P. R. China
MOC:	Ministry of Commerce, P. R. China
SAAS:	Sichuan Academy of Agricultural Sciences, China
UPWARD:	Users' Perspectives with Agricultural Research and Development
ASP:	Annals of Sichuan Province
CSY:	China Statistical Yearbook
CYA:	China Yearbook of Agriculture
RSY:	Rural Statistical Yearbook of China,
SSB:	Sichuan Statistical Yearbook
SSA:	Sichuan Statistical Yearbook of Agricultural and Husbandry
SYS:	Statistical Yearbook of Sichuan
HRS:	Household Responsibility System
SMC:	Supply and Marketing Co-operatives
AIC:	Agricultural Input Company
EBBT:	Exploratory Buying Behaviour Tendencies
OSL:	Optimum Stimulation Level
CPP:	Compulsory Procurement Price
AQP:	Above Quota Procurement Price
URP:	Unified Retail Price
NP:	Negotiated Price
CP:	Contract Price
PP:	Protective Price
MMIP:	More Market Integrated Processors
LMIP:	Less Market Integrated Processors

Measurements

1 hectare = 15 mou
1 USD = 8.27 Yuan (May, 1999)
1 Kilogram = 2 jin

Acknowledgements

CHAPTER 1

INTRODUCTION

1.1 Objectives

The Chinese economy is experiencing a period of transition from a centralized planning economy to a market oriented economy. Agricultural marketing in China is changing fundamentally. This change deserves scientific research on subjects including how marketing can contribute to a smooth transition towards a market-oriented economy. This research intends to investigate the role of agricultural marketing in the shift from a government-driven economy towards a marketing oriented economy. It is embedded in a conceptual framework to ascertain the role of the marketing system in an economy in transition, in which suggestions for improving the marketing system in terms of market structure, market institutions, market information and consumer orientation are presented.

   The study focuses in particular on the Chinese sweetpotato marketing system, since sweetpotato as an early-liberalised crop offers a unique opportunity for studying marketing in a transitional economy. In addition to the market structure, market institutions and market performance, we will focus on consumers. Since consumers are the final stage of the marketing system, understanding their needs, perception, preferences and buying behaviour is of critical importance for both public and private sectors. More specifically, the research objectives of the study are:

➢ To review the transition of Chinese agricultural marketing from a centrally planned economy towards a market oriented economy.

➢ To obtain a better understanding of consumer behaviour with respect to sweetpotato products, in particular of consumer perception, preference and use.

➢ To analyse the sweetpotato marketing system, in particular market structure, marketing functioning and market performance.

> ➤ To draw conclusions about how to improve the sweetpotato marketing system and agricultural marketing in transitional economies in general.

1.2 The Problem Area

Marketing has been largely ignored in China due to the domination of a panned economy. Most attention was paid to administrative intervention and political factors to increase productivity. However, marketing has gradually become more relevant. During the last two decades of reform, Chinese farmers have been shifting from subsistence production towards commercial production. Intermediaries and traders are replacing government agencies and are actively involved in the marketing channels. Private enterprises coexist alongside the state-owned, collective enterprises. Consumption patterns are also changing dramatically given consumers' rising disposable incomes. In recent years, considerable studies have been carried out to understand these changes, however most of them focus on the foremost important crops, such as rice and wheat. Research on sweetpotato is little touched upon, given its less important role in the national economy. Nevertheless, sweetpotato is a very important crop in the poorer regions of China and plays a significant role in their economy.

Sweetpotato utilisation has changed substantially over the past few decades. The role of sweetpotato has shifted from a human staple food[1] to animal feed and a raw material for food production. Household processing of sweetpotato has become widespread since the economic reforms started in the late 1970s. However, little is known of the impacts of these changes on rural economies and on marketing procedures. The major question is how the sweetpotato marketing system works. One of the main products derived from sweetpotato processing is sweetpotato noodles. There are different varieties of noodle products in the markets, and this gives rise to a number of different questions. What are consumers' perceptions, preferences and uses of sweetpotato noodles? And how can the marketing system be improved and further stimulate the production and consumption of sweetpotato products?

---

[1] The main food crops in Sichuan are rice, wheat, maize and sweetpotato.

1.3 Approach of this Study

1. 3.1 Research Questions

The study provides an overall view of the sweetpotato marketing system, focusing on products derived from sweetpotato. It consists of two main components: consumer behaviour study and marketing system analysis. These two components are interactive, since consumers are the main drivers in the marketing system and an efficient marketing system can better meet customers' wants and needs. The objectives of the study are elaborated in the following research questions.

Research Questions on Consumer Behaviour

1: What are the main factors affecting consumer behaviour with regard to sweetpotato product consumption?

2: Can the consumer markets be segmented and profiled on the basis of consumers' characteristics or responses?

3: How can the empirical results be used to design an efficient marketing strategy for sweetpotato products?

Research Questions on the Marketing System

1: What are the marketing structures of the sweetpotato industry? Which developments in the marketing structure characterise the transition from a centrally planned to a market economy?

2: What are the patterns of co-ordination and integration in the marketing channel? What is the degree of competition level in the markets?

3: How does the sweetpotato marketing system perform in terms of effectiveness and efficiency?

1.3.2 Selection of the Research Area

Although sweetpotato is not considered to be an important crop in China, China is the largest sweetpotato producer in the world. The output of fresh sweetpotato roots reached 123 million tons in 1996. This volume accounts for 85% of the total world sweetpotato production. The five largest sweetpotato producing provinces in China are Sichuan, Shandong, Henan, Anhui and Guangdong, which account for 56% of the national production. Sweetpotato production in Sichuan Province was 25 million tons in 1996, representing 20% of the China's total sweetpotato production. Sweetpotato planting areas amounted to 1.4 million hectares, ranking it the fourth most important crop in Sichuan after rice, wheat and maize. Sweetpotato production in Sichuan Province is approximately the same as the sweetpotato production of the rest of the world outside China. Due to its huge sweetpotato production and its representativeness of middle-level income regions, Sichuan was chosen as our study area.

Sichuan Province is located in the southwest of China and covers an area of 570,000 km^2. Its capital is Chengdu. The province is surrounded by low hills (200m) rising to 3,000-metre high mountains. In the middle of these mountains is a broad wide basin named the 'Sichuan Basin'. The basin is known as "Heaven's Granary", due to the high productivity of the rich and fertile soil. When talking about Sichuan, people always think of its three representative features: Sichuan's large population (110 million), the large number of pigs bred at household level (130 million), and the bamboo forests browsed by the panda bear. Sichuan's hundred million people make it the most populated province in China, but the cultivable land per person amounts to only 0.23 hectares - about the size of a suburban back garden in developed countries.

Sweetpotato used to play an important role in Sichuan's food security as a staple food for humans. However, since the start of China's economic reform, sweetpotato is gradually becoming a crop to generate income for farmers by adding value through processing activities. Sweetpotato processing activities can be traced back more than a century in Sichuan. However, its real expansion came in the 1980s after the markets were liberalised and thousands of individual households began sweetpotato processing activities on a commercial basis. Anyue County and Santai County are the most popular processing counties in Sichuan Province and were chosen as the research sites of processing activities in this study. Anyue is the largest county in

Sichuan with a population of 1.5 million, 94% of whom are rural dwellers. Santai has a population of 1.4 million with 92% rural dwellers. Anyue County has a longer household processing history compared with Santai County. The geographical location of Sichuan Province and the research areas in this study can be seen in Figure 1.1 and Figure 1.2.

1.3.3 Outline of the Study

The study basically consists of four parts. Part One (Chapters 2, 3) is a conceptual framework, in which the theory of institutional economics is used to analyse Chinese agricultural marketing in an economy in transition. The analysis is made at both institutional environment level and governance structure level. The transition process of China's agricultural marketing from a centrally planned economy towards a market-based economy is elaborated. This framework is applied to the sweetpotato industry. The conceptual framework helps to understand the sweetpotato economy in Sichuan Province.

In a market economy, consumer demand provides incentives for economic activities. This is the reason why Part Two (Chapters 4-6) concentrates on a consumer behaviour study. Consumer preferences and choice behaviour with respect to sweetpotato products are analysed. A series of hypotheses based on consumer behaviour models with respect to food consumption is formulated and tested. Part Three (Chapters 7,8) studies the sweetpotato marketing system, which includes a description of the sweetpotato marketing structure, market functioning, distribution channels and the assessment of marketing performance.

Understanding consumers' wants and needs is only a first step; most important is whether and how the market system can respond to consumers' knowledge. This is discussed in the market orientation and conclusions of Part Four (Chapter 9).

Figure 1.1 The Map of People's Republic of China

Figure 1.2 The Research Areas in Sichuan Province

CHAPTER 2

INSTITUTIONAL CHANGE AND MARKET DEVELOPMENT

2.1 Introduction

There are different approaches to study the transition process from a centrally planned economy toward a market-oriented economy. The institutional approach seems to be the most striking one. 'Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction', and 'the major role of institutions in a society is to reduce uncertainty by establishing a stable (but not necessarily efficient) structure to human interaction'. (North, 1993). Transition of the economy refers to redefining the rules of economic activities, involving both demolishing old constraints and creating new ones.

There is a relationship between institutional change and economic performance. David and North (1971) developed an institutional change model and demonstrated how the development of economic factors called for institutional innovation. North (1993) also presented an analytical framework of how institutional change affects economic performance. The theoretical concept of institutional analysis in relation to the performance of economies was applied to the comparable cases of England and Spain. He illustrated how the two countries took different institutional approaches (Parliament in England and the Cortes in Spain) from the beginning of the sixteenth century. In the end, England created a more effective, impartial judicial system, more secure property rights and a sound financial base, while Spain declined from being the most powerful nation since the Roman empire to a second rate power. Lin (1995) also explored how institutional innovations (land, labour and rental markets) were induced from China's rural reform which started in the late 1970s.

The above examples illustrate how important institutional changes can be in relation to economic development. Williamson (1998) took a broad approach to social analysis from an institutional perspective. He distinguished four institutional levels based on the New Institutional Economics (NIE) as presented in Figure 2.4 (p. 35). Level 1 is the social embeddedness level and includes customs, traditions, norms, codes of conduct and religions. These institutions change very slowly, over a period

of centuries or even millennia. Level 2 is the institutional environment, often referring to the 'rules of the game' within which economic activity is organised. Polity, judiciary, bureaucracy, property rights are allocated here. This level is called by Williamson '1st-order economising', or 'get the institutional environment right'. The frequency of change for this level is around 10 to 100 years. The third level is labelled as the governance of institutions, or the 'play of the game'. This '2nd-order economising' is intended to get the governance structures - markets, hybrids, firms, and bureaux - right. The frequency of changes for institutions of this level will take place within decades. Transaction cost economics operates at this level. The fourth level of economics of institutions refers to resource allocation, and focuses of the marginal analysis on decision variables, like prices and quantities. The solid arrows in Figure 2.4 indicate the imposed constraints from a higher level to the level immediately below, while the dashed reverse arrows refer to feedback signals from a lower level to a higher level. In fact, the NIE mainly deals with Level 2 and Level 3 of the scheme, which are the institutional environment (the rules of the game) and the institutions of governance (the play of the game).

NIE studies market organisations that enable the market to work. 'Markets are understood as the interplay between various actors under a given set of constraints (institutions) which are as such not stable over time but which may be changed by those actors or third parties.' (Kirchner, 1995). NIE has also been applied to the study of development economics, particularly in LDCs (Nabli and Nugent, 1989, Harriss, Hunter and Lewis, 1995). Ill-defined property rights, static regulation, market failure and lack of market institutions in developing countries make NIE especially relevant to the understanding of development.

Based on Williamson's NIE theoretical framework, we propose an analytical framework and apply it to analyse the transition of China's agricultural marketing as presented in Figure 2.1. By skipping Level 1 and Level 4 of Williamson's scheme, we focus on two NIE levels for the discussion of agricultural marketing transition in China, Level A: 'getting the institutional environment right' and Level B: 'getting the governance structure right'. At level A, we focus on property rights and legislation. China's agricultural institutional reforms of the 'Household Responsibility System', and policy changes on agricultural production and prices will be reviewed. These reforms have fundamentally changed the institutional environments and redefined the rules of economic activities.

With respect to the second level (B) of 'getting the governance structure right', we focus on the bureaux and markets as mentioned in Williamson's scheme. The 'Grain Bureau' and 'Supply & Marketing co-operatives' were designed to take care of the rules of economic activities as defined in Level A. Following the changes of the institutional environments at the high level, the roles of 'Grain Bureau' and 'Supply & Marketing co-operatives' also have to be adjusted. Newly emerged agricultural markets will also demonstrate how the market development causes the appearance of new marketing institutions.

Figure 2.1 An application of Concepts of New Institutional Economics to Agricultural Marketing in the Chinese Transitional Economy

Transitional Levels	Applying to China's Agricultural Marketing
Level A: Getting Institutional Environment Right. * Property Rights * Legislation	1.Household Responsibility System (HRS) 2. Deregulation of Agricultural Production 3. Policy of Price Liberalisation
Level B: Getting Governance Structure Right.	1.Transformation of Grain Bureau 2.The Role of Co-operatives 3.Newly Emerged Agricultural Markets

The rest of this chapter will follow the framework of Figure 2.1. Section 2.2 will emphasise the rule of the game, in relation to institutional environmental transformation in China's agricultural sector. Section 2.3 refers to getting the organisational structures right. At the end of the chapter, a framework of agricultural market transition is summarised.

2.2 Getting the Institutional Environment Right

2.2.1 Theory in Action

Many countries have experienced transitional periods in this century, however, none of them have drawn so much attention as those of East Europe, in particular the former Soviet Union, and Southeast Asia. The common upheaval concerns their transition from a centrally planned economy toward a market-based economy.

Although each country has different priorities during its transition, including the speed, depth and timing, the strategic policies of countries in transition are basically similar. They can be categorised in policies focusing either on institutional or on economic aspects of the transitional process. The economically oriented policies are the main component in most transitional countries. They include economic deregulation, such as price and trade liberalisation, financial restructuring and enterprises privatisation. Institutional transition involves changing the rules of the game, such as constraints on human and business behaviour. Both economic and institutional approaches are interrelated: the institutional framework provides the environment for inducing economic growth, and an institutional system lagging behind will hinder economic reforms. In its turn, the development of economic factors puts pressure on the institutional evolution. The institutional aspects of a country in transition cover the building-up or redefining of administrative regulation, political institutions, and regulating the legal systems necessary for a market economy. In the following discussion, we will focus on property rights and legislation, which are the most important items corresponding to the institutional environment, or the rules of the game.

2.2.1.1 Property Rights

Originally, 'property rights' is a juridical term within the legal system. However, it has been heavily appropriated by economic disciplines. NIE uses the following definition: 'property rights are determined and guaranteed by some form of governance structure or order - i.e., a system of norms plus the instruments that guarantee this order.' (Furubotn and Richter, 1991). Generally speaking, the right of ownership is one of the best known property rights, and it includes the right to use the asset, the right to appropriate the return from the asset and the right to change its form, substance and location. A property right that is not well-delineated is consequently in danger of asset appropriation by others - not just by theft but also by excessive choosing, free riding and shirking. As an example, the carefully marked North Sea borders among seven surrounding countries have ensured their property rights concerning the sea. Furthermore, the gas and oil values of the North Sea have increased due to the well-delineated property rights (Barzel, 1989).

The restructuring of property rights in a transitional economy is one of the central topics for institutional change. Property rights are widely described in line with the privatisation in transitional countries during this decade. In fact, privatisation in a transitional economy transfers full or partial property rights of state-owned or collective-owned enterprises to private sectors. This process is strongly involved with the delineation and transformation of property rights. More secure property rights would encourage and speed up the transition process toward a market economy.

Massive privatisation has been undertaken in Eastern Europe and the former Soviet Union in recent years. Taking the Czech Republic as an example, privatisation began in 1990 and was finished by the end of 1995. It was reported that 21,605 new business units were created from 3,552 state-owned enterprises via leasing, sale, auctioning or joint-stock operations (Mejstrik, 1996). Also in China, the most centralised country, privatisation is under way in one form or other. The Chinese government policies for privatising state-owned enterprises can be described as 'Seizing the large ones while releasing the medium and small ones'. The government selected 1,000 state-owned large enterprises as reform priority to be carried out by improving internal governance, promoting competition and diversifying ownership. The government will lose control of around 90,000 small state-owned enterprises (World Bank, 1996). These small- and medium size enterprises will be transferred to the non-state sector through sales, leases or contracts. The methods of transformation depend on the enterprise situation and local government's objectives. Figure 2-2 shows the degree of privatisation when the enterprises take different approaches. At the starting point, enterprises are state-owned and the assets are public properties, and therefore no private element exists. When enterprises provide lease contracts to private sectors, part of the property right is transferred while the ownership still remains for the state. A further degree of privatisation is the method of joint venture. Private firms make an investment in state-owned enterprises and diversify the ownership by diluting the government's share. Complete privatisation is achieved by selling out the enterprises. The 'sell out' methods include direct sale of assets; public offering of shares through an organised market such as a stock exchange and auctioning; and management/employment buy-out (Lin and Chen, 1996).

Figure 2.2 The Degree of Privatisation for the Transformation of State-owned Enterprises

State-owned Enterprise	Lease Contracts	Joint Venture	Sell out

0%   100%

Degree of Privatisation
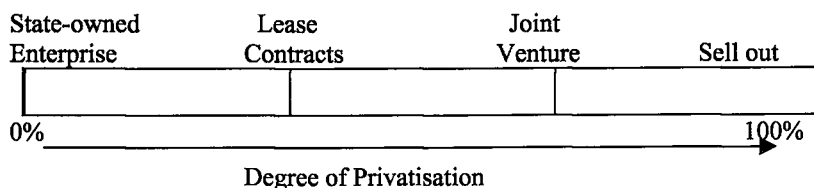
Whichever privatisation method is chosen, it involves property right restructuring of some sort from a small degree to a complete transfer. Complete privatisation in China has not yet occurred since land is still owned by either the State or collectives. The advantage of land privatisation is that it could lead to more efficient uses of the most precious natural resource 'land', and increase the economies of scale. On the other hand, keeping the land under central control could reduce or avoid social turmoil and keep the economy relatively stable during the transition. In addition, privatisation in China also faces a series of other difficulties, such as poor accounting systems and lack of legislation support.

2.2.1.2 Legislation Framework

Legislation is another main factor in getting the institutional environment right. It guarantees the implementation of defined rules, such as property rights. Following the abolition of communist constitutional laws, foreign legislative models have been introduced in transitional countries in order to avoid a legislation vacuum. Dozens of new laws have been rapidly enacted and issued to support the privatisation process, or to establish new market institutions which give permission to market activities forbidden under a centrally planned economy, such as the Law of Contracts, Law of Banks, Law of Property Rights, and so on. The Law of Economic Contracts was adopted in 1981 and became effective in July 1982 in China (Folsom and Minan, 1989). The purpose of this law is to protect the legitimate rights and interests of the parties involved in economic contracts. These economic contracts include a broad range of business agreements, from buying, selling, property rental, construction projects, to science & technology co-operation. Thus, the Law of Economic Contracts plays a vital role in Chinese economic activities.

Financial institution restructuring is one of the domains that strongly relies on legislation, and it is also the most novel aspect during the transition. Establishing a stable, efficient and safe financial system is fundamental to the transition of the whole economy. Concerns about the financial development include payment systems, bank rehabilitation, banking system structure and supervision, and financial market development (OECD, 1997, p24). The adaptation of new bank laws can accelerate building up the new bank system and the further separation of public policy banks from pure commercial banks. A series of bank laws, including the Budget Law, Central Bank Law, and Commercial Banking Law, have therefore been passed since 1993 in China (World Bank, 1996). The People's Bank of China was separated from the Ministry of Finance and became the central bank. Other state commercial banks, such as the Agricultural Bank and the Construction Bank, are gradually being transformed into genuine commercial banks. The establishment of new commercial banks, non-bank financial institutions and foreign financial institutions is also supported and encouraged. The establishment of a sound financial section strongly requires the support of legislation.

The widely discussed legislation with respect to agricultural marketing institutions concerns among others the transformation of the Supply and Marketing Co-operatives (SMC). In the command economy, these co-operatives were controlled and organised by the central government. Their main duties were to collect agricultural products from farmers and deliver agricultural inputs. Functions of SMC have been either abolished or transformed during the transition. The institutional set up of the SMC itself is also facing a transformation. There are different ways of restructuring agricultural co-operatives. In particular, the property rights of co-operatives require urgent redefinition in order to transfer ownership from the state to its members. New co-operative legislation and regulation have to be made compatible with a market economy to ensure the revival of efficient co-operative activities satisfying members' needs.

The transition of the institutional environment has changed the economic structure profoundly in China. The following section is devoted to describing institutional environmental changes in China's agricultural sector. The Household Responsibility System (HRS) outlined in section 2.2.2 has changed the institutional structure of China's rural society and made a great contribution to the Chinese economy. The deregulation of agricultural production and price liberalisation described in sections

2.2.3 and 2.2.4 were the central agricultural policies, which directed agricultural production and the price formulation mechanism. These two sections will focus on the evolution of agricultural production and prices policy during the transition period of the last two decades, and try to elucidate how the State is gradually removing the legal restraints on agricultural production and prices.

2.2.2 Deregulation of Agricultural Institutions: the Household Responsibility System

The Household Responsibility System (HRS) was the landmark of the beginning of China's economic transition. It was initiated by a group of farmers in Anhui Province in 1978 and soon spread throughout China as the central government's reform policy. The principle was to redistribute collective property to individual households, which included agricultural land, animals, agricultural machinery and so on. Land was assigned, but not privatised, to each household based on the number of persons in a household and its labour power. The government signed contracts with individual households for a minimum of 15 years of land use. The state has vested farmers with land use rights without changing its collective ownership. Draft animals and small- and medium-sized agricultural machinery were also assigned to farmers in different ways, such as by purchase or leasing, while large items of agricultural machinery and irrigation facilities still were operated and maintained by collectives. On the other side of the agreement, farmers were obliged to deliver the contracted quota to the state and maintain the collective properties they had in their hands.

The HRS brought great incentive to agricultural production. Autonomous individual households replaced the central planning authority. They became responsible for their own production decisions. The traditional central planning, such as what crops and how much of each was to be sown, was abolished. After delivering the contracted quota, farmers keep the rest and are completely independent regarding their other agricultural activities. The efficiency of resource allocation over both farmland and farm labour was also significantly enhanced, as they could be deployed according to the principle of comparative advantage. The policy led to greater economic flexibility and has immensely stimulated farmers' incentives. Within five years, agricultural productivity rose by 50 percent (McMillan, 1995). A series of research results shows that about 30 to 60 percent of the agricultural production

growth during the 1980s is the result of increased efficiency from the HRS reform (Fan, 1991, Lin, 1992, Huang and Rozelle, 1996, and Zhang and Carter, 1997).

By the year of 1995, almost all earlier signed land contracts were ended. The government policy now is to continue signing land contracts on another 30 year base. For permanent crops, contracts can be drawn up for 50 years and these contracts can also be made inheritable in order to encourage long-term investment and soil improvement. However, farmers are forbidden to sell or use the land for other purposes instead of agriculture. Therefore the HRS has partially transferred property rights to farmers, in the form of the right to use the land, and the right to appropriate the returns from the land, while the right to change land use has remained with the collectives. Tremendous agricultural efficiency has been achieved even only from the partial property right transfer. McMillan (1995) defined it as 'Contractual incentives substituted for ownership incentives.'

The farmer-originated HRS occurred at a moment when rural development was sluggish and agricultural production had stagnated after a decade of the Cultural Revolution. The traditional collective-based agricultural production brought equality for each member but could not stimulate workers' incentives. Farmers were ready for changes, which meant that the extension and promotion of HRS at national level then became an easy task. The success of the HRS in rural areas encouraged Chinese government to expand the reforms to other sectors in the ensuing years.

2.2.3 Deregulation of Agricultural Production

China produces thousands of varieties of agricultural products because of its broad geographical conditions and diverse demands. After the foundation of The Peoples' Republic of China (P.R. China), the communist government grouped all agricultural products into three categories to ensure food supply and social stability. The definition is based on the product importance in term of contribution to the food security of the national economy and the aggregate supply and demand situation.

Products in category 1 were of strategic importance for the national economy and food security. The marketing policy for this category was called *'tonggou-tongxiao'* (unified procurement and sale) and was first announced for grain in 1953, then extended to edible oil and cotton in the following few years. This phenomenon marks the beginning of the centrally planned economy. According to farmers' arable land,

state officers estimated the quantities of crop production and then fixed the compulsory procurement quota that farmers had to deliver to the government. The quantity of compulsory quota was based on the surplus of total crop production minus the sum of households' grain ration, animal feed and crop seed. There were strict rules about the areas to be sown and production planning for these crops. Products in Category 1 could only be procured by the central government at fixed prices. The state shops then sold these products to urban consumers at ration price upon the presentation of coupons. Any unauthorised enterprises and individuals were forbidden to engage in transaction activities of those products.

Products in Category 2 were those which were important raw materials for urban industry, living necessities, or products for export. They were defined in 1955 and included pork, tobacco, hemp and flax, sugarcane, tea, silk cocoons, wool and Chinese medicine, etc. Farmers had to deliver these products up to certain assigned quotas to the government. This policy was called *'paigou'*, which means assigned procurement. After fulfillment of assigned procurement, farmers were allowed to trade the surplus of the Category 2 products at the local markets or exchange among farmers.

All products not falling in Category 1 or 2 belonged to Category 3. Those were mainly local products and not for urban-rural exchange (Huang and David, 1994). Category 3 products could be traded freely in the markets.

This marketing policy remained in place until 1985, when the second wave of agricultural reform announced the elimination of the state compulsory procurement system. However, since 1979 with the introduction of Household Responsibility System policy, both the numbers of agricultural commodities and quantities under the mandatory procurement for Category 1 and 2 products gradually decreased over time. The state procured grain quota dropped from 37.75 million tons in 1979 to 30.32 million tons in 1982 (MOA, 1995a). The number of agricultural products belonging to Category 1 or 2 was cut from over 100 originally to 38 by the end of 1984 (MOA, 1995). All aquatic products were released from Category 2 and have been freely traded since 1984 (MOA, 1995a). All agricultural product markets were liberalised by early 1990s except for grains (rice, wheat and maize), cotton and tobacco.

The basic reason for regulating agricultural production was the shortage of supply. Given the low production, a long period of civil war and rising population, agricultural supply lagged far behind demand when the communist government took

over power in China. The priority of maintaining national food security was to produce enough food for everybody. Natural resources were then concentrated for main grain production, but this could not guarantee an efficient resource allocation and led to the loss of social welfare. Four decades later after the establishment of P.R. China, agricultural R & D made great contributions to the immense increase in agricultural production. The rising supply of agricultural products led directly to the deregulation of agriculture, which brought the rigid production system to an end.

2.2.4 Deregulation of Prices

Prices have been a major government policy instrument in China's agricultural marketing for over thirty years. Planning prices were set by central government and adjusted mainly according to government objectives. Price adjustment is heavily dependent on government projections of supply and demand. Table 2.1 presents various special price-systems employed during different economic development periods. These price-systems can be basically separated into two stages: pricing in the central planning economy (a to d) and pricing in the transition period (e to g) with a watershed in 1985.

Table 2.1 Different Prices of Agricultural Products from 1949 to 1997

Name of Prices	Period of Implementation	Notes
a. Compulsory Procurement Price	1953 - 1985	Adjusted in 1961, 1966, 1979. Always lower than b.
b. Above Quota Procurement Price	1965 - 1985	50% higher than a.
c. Unified Retail Price	1953- 1993.	Not adjusted until 1989. Always lower than a.
d. Negotiated Price	1979 - present	Higher than a. More liberalised after 1983.
e. Contract Price	1985-present	=(70% of c.+30% of a.). Adjusted in 1992, 1993,1994, 1995, 1996, close to g. currently.
f. Protective Price	1985 -present	Does not work well.
g. Market Price	1953--1985, for a limited number of products, 1985—current, all crops except for grain.	Normally, higher than all above prices, lower than f. occasionally. More price transparency after 1985.

2.2.4.1 Price Formation in the Centrally Planned Economy

a. Compulsory Procurement Prices (CPP) were the dominating prices during the centrally planned economy. In fact, CPP were the state quota prices paid to farmers for Category 1 and 2 products. They were set by central government and kept constant for the whole country most of the time. These prices were adjusted only a few times during their existing periods, and increased by about 60% during the period 1953 - 1985.

b. Above Quota Procurement Price (AQP) was introduced later than CPP in case the quantity of state purchases of grain based on CPP were not enough. Since the quotas purchased at CPP were fixed every 3 to 5 years (with provincial differences) and the population was growing rapidly, the demand for food became very intensive in the 1960s. In order to procure more grain and provide an incentive for production, the AQP was set 50% higher than the CPP. The AQP price system ended in 1985 together with the disappearance of CPP.

c. Unified Retail Prices (URP) were the quota consumption prices paid by urban consumers. These prices remained constant for more than thirty years until the adjustments in the late 1980s and the early 1990s. Because the URP was much lower than the CPP, the government policy favoured urban consumers. The state not only had to maintain the storage houses and transportation, but also had to bear a heavy fiscal deficit to keep the system working. This financial burden and the sufficient supply of agricultural production led to the termination of urban grain ration subsidies in 1993, finally leaving the staple grain supply to market forces.

d. Negotiated Price (NP) was introduced as a kind of quasi planned price in 1979, and was set above CPP but much lower than free market prices. State grain companies could buy grain from farmers at the Negotiated Price after they had fulfilled the national procurement. Farmers were not obliged to sell their products at the Negotiated Price, but the state food stations were forbidden to refuse the sale from farmers. However, the Negotiated Price has been more liberalised since 1983 and it follows the free market price closely. Grain stations were encouraged to purchase more at the negotiated prices in order to ensure as much grain control by the state as possible. (CYA, 1984).

2.2.4.2 Price Formation in the Transitional Economy

e. Contract Price (CP) was introduced in 1985 as a substitute for the CPP when the unified compulsory procurement system was abolished. The state no longer assigned any compulsory procurement quantity to farmers, but signed contracts with them instead. The contracts were only signed for important products, like grain, cotton, edible oil, sugarcane and pork, etc. CP was set between CPP and AQP in 1985 (70% of AQP + 30% of CPP). Currently, government sets CPs before the crops are planted. In most cases, they are much lower than market prices. There have only been two occasions in the past when CP was higher than market prices, one was in 1992-1993, and the other was in 1997-1998. This was due to the fact that CPs are pre-determined in advance, but market prices change over time. When market price declines to a low level, CP will be higher than market prices.

f. Protective Price (PP): The government of China adopted the Protective Price for its main agricultural products in 1985 when the CPP was abolished. The protective prices in 1985 were set at the CPP of 1984 (Cai, 1990. P136). In 1993, the State initiated the Grain Risk Funds system. The *Protective Price* should be set according to compensating for production costs, suitable profits for farmers, and the state budget abilities (MOA, 1997a). Theoretically, farmers are free to sell their grain to the state at PP. However, the practical implementation of the PP-system has serious drawbacks. During the harvest year, the free market prices of grain could be lower than the Protection Price of that year. In that case, farmers take advantage of the PP-system by selling all their grain to the state at the PP and afterwards purchase for their daily consumption from the markets. The results are that the government has to bear a heavy financial burden of accepting and storing these surplus grains. On the other hand, commercialised state grain companies reluctantly receive farmers' grain at the high protective price when government finance cannot afford to meet the difference between market price and protective price. In such cases, grain stations also try to lower the quality standard and therefore lower the actual prices offered by grain stations to farmers.

g. Market Price: Market prices existed during both the centrally planned economy and transition period. However, the degree of price freedom was constrained by the lack of market liberalisation during the centrally planned economy. In the transitional period, market prices have become more meaningful and are important market

signals, since most agricultural product prices are determined in the open markets or wholesale markets by market supply and demand.

Box 2.1 Wheat Price Implementation in 1998

Contract Price of wheat was set by the government at 1.44 yuan/kg in early 1998 or late 1997, but the market price was only 1.20 yuan/kg in the fall when wheat was harvested. The grain stations then paid farmers at 1.44 yuan/kg.

Protective Price of wheat was set at 1.26 yuan/kg based on the market price of wheat in April-May 1998 before wheat was harvested. However, market price declined after April-May and was only 1.20 yuan/kg after June when wheat was harvested, the farmers were then protected at 1.26 yuan/ kg, instead of 1.20 yuan/kg.

Price liberalisation has been executed by setting prices free gradually. The transition process began with price increases for the compulsory procurement products after fixed prices for a number of decades. The objective of the price increment policy was to increase farmers' income. By the early 1990s, the state announced that quota procurement prices would be increased to close to market prices, and sometimes even higher than the market prices. That greatly encouraged farmers to produce grain. Table 2.2 gives a comparison of two sets of wholesale prices in December 1996 as an example. As can be seen from the table, contract prices are close to market prices for maize and rice.

By eliminating product category control, price control is abolished. The central government no longer sets quota prices for those released agricultural products and lets prices be determined by market forces. The only prices for which the government still intervenes at present are the prices for grain and cotton.

Table 2.2 The Different Prices of Rice, Wheat, Maize and Bean in December 1996.
Unit: Yuan/ton

Items	Rice (late season)	Wheat	Maize	Bean
Market Price(1)	1570	1640	1253	3334
Contract Price(2)	1509	1466	1240	2238
Difference(3)=(1)-(2)	61	174	13	1096
% of Difference(4)=(3)/(2)	4	12	1	49

Source: MOA, 1997.

As we can see from the above discussion, multiple tracks of prices coexisted during the same periods. Prices did not act as the 'invisible hand' in the past in China's agricultural markets and even now can only perform this task to a limited extent. The basic reason for the strict and complicated pricing system in the last few decades was the pursuit of food security by the Chinese government. Given the shortage of food supply and low income per capita, providing the basic food needs to its people at controllable lower prices was the government's central policy. The existence of different price systems induced opportunistic behaviour and violated the positive impact of free market prices on the allocation of production factors. For example, most of the time market prices were higher than the government's contract prices, and farmers tried to sell poor quality products to the government and kept higher quality products for market sale at good prices. Urban consumers were not happy with the poor quality products supplied by state shops and they turned to purchase on the free markets.

2.3 Getting the Governance Structure Right

2.3.1 Introduction

Section 2.3 will focus on Level B: getting the governance structure right as presented in Figure 2.4. In the planned economy, the Government of China had complete control over the agricultural system. The static production system and rigid price mechanism required a corresponding governance structure to keep them operational. The circulation of key agricultural products and agricultural inputs was mainly monopolised by the two state-controlled institutions: the Grain Bureau (GB), and the Supply and Marketing Co-operatives (SMC). Both of them developed comprehensive networks to implement the state marketing policy. The state owned all the assets and

reserved most of the control over them. During the transitional period, partial property rights are transferred from the state in different manners. Both of the traditional market institutions were given incentives to commercialise and pursue profit, while still executing government policy when called upon.

The traditional bureaux are being transformed toward more market orientation in one way or another, and new market institutions are also emerging which fill up the market vacuum. In this section, the transformation of the traditional state governance organisations, the Grain Bureau and the Supply & Marketing Co-operatives, are firstly described. The new development of China's agricultural markets, including open markets, wholesale markets and futures markets, is then reviewed.

2.3.2 Transformation of Grain Bureau

The Grain Bureau is a state agency which is responsible for the grain procurement and circulation at national level. It was established in the 1950s when the central planning policy was started. Up to now, the state Grain Bureau system has been well developed and comprises thousands of operational units at national, provincial, city and county levels. It monopolised the grain markets for almost 40 years. A total of 160,000 grain organisations hired about 4 million personnel in 1991 (MOC, 1992), including Grain Bureau officers at different administrative levels and staff from thousands of affiliated grain procurement stations and food shops.

Grain Bureaux operate under government instruction and implement the policy of state procurement and marketing of grain, such as how much grain has to be procured and prices for each year. The operational grain procurement stations and food shops are the actual functional agencies for government grain policy. Many of these grain stations contained full-scale operating facilities, including transport fleets, storage houses, processing machines and market networks.

The landmark in the trend of grain production toward free marketing was in 1985 when the Grain Bureau was first allowed to trade commercially in the markets by following the local market prices (Park and Rozelle, 1996). Their participation in the markets was more commercial and profit-driven than ever before. As the transition continued during the early 1990s, policy makers further advocated a wide-ranging commercialisation of the Grain Bureau. Beginning in 1992, both rural and urban grain stations and shops were transformed into commercial grain trading companies

(Rozelle, et al. 1998). Many managers in these companies signed contracts with the State, within which their rights and duties were clearly defined, including a profit sharing arrangement. These newly commercialised grain companies have certain decision-making responsibility over their businesses. The company managers are given the use rights of state-owned assets, like storage facilities and fleets of trucks, which provide great contractual incentives to earn profit. However, they are also expected to retain certain policy functions, like quota procurement, storage of stocks, and continuation of trading in grain and oilseed. Managers have more freedom in determining personnel wages, bonuses, and can even freely choose their suppliers, including private wholesalers, which never happened previously. These transformed grain companies have diversified their product lines and improved their quality of service. The new incentives increased the efficiency of the grain trade. The success of the Grain Bureau transformation stems from the complete separation of control rights over assets from ownership of assets. The principal (the State planner) grants the agent (the managers) the right of making decisions over the business while the ownership is kept unchanged on a contract base. The agents are obliged to maintain the grain policy implementation and share profit with their principals. Therefore, the signed contracts have to be well defined, and the legal system needs to be adapted so that these economic contracts can be reliably enforced.

2.3.3 The Role of Co-operatives

China's Supply and Marketing Co-operatives (SMC) were originally founded in 1954 as farmers' co-operatives (collectively owned) and set up at provincial, county and township levels. Because of the heavy intervention by the government and a series of political movements, the SMC soon became a purely state-owned organisation, although there has been a wide debate on the ownership of the co-operatives. As huge as the Grain Bureau, SMC employed more than 5 million personnel nationally for its 700,000 scattered units (MOC, 1992). The objectives of SMC were defined as offering services for the members' agricultural production and daily living, as well as playing its role in the state procurement and marketing of agricultural products (Cai, 1990). The main activities in which SMC were engaged included purchasing agricultural products, delivering industrial goods and production means, marketing agricultural products, credit and financial support, information services and so on.

The functional difference between GB and SMC is that GB is mainly responsible for grain procurement and circulation, while SMC is in charge of the rest, mainly products in Category 1 and 2, and other processed agricultural products.

The Agricultural Input Company (AIC) is one of SMC's main functional agents, specialised in the procurement and delivery of agricultural inputs, mainly fertiliser, pesticides, agricultural plastic film and diesel. Under the centrally planned economy, AIC implemented the State's policies, from fertiliser distribution to input price subsidies to farmers. The distribution of these inputs was closely related to farmers' quotas, in the form of input subsidy for farmers such as favoured purchasing prices, or supply of some fertiliser for free if farmers delivered more grains than their quota. In order to achieve grain production and procurement objectives, agricultural input prices had to be kept low and direct fiscal subsidies had to be paid to the manufacturer.

In line with the elimination of the quota system of grain procurement and the initiation of urban industry reform, fertiliser markets began to be liberalised in 1984. Agricultural input manufacturers for the first time had the right to sell their products under a guideline price determined by the State. AICs were no longer the only player in the distribution channel of agricultural inputs; farmers and private traders were permitted to engage in the fertiliser trade for the first time in 1984. However, with the rising level of competition, collusion and bribes appeared in the premature and unpredictable markets. The liberalisation of agricultural markets led to a spiked price rise and a supply shortage of all agricultural inputs (MOA, 1995). In 1994, the new policies were recentralised for agricultural input markets to ensure a stable supply. Ceiling prices were set at both factory and retail levels. The distribution channels were more regulated. AIC was redefined as the main distribution channel for fertiliser, with a few other agents including agricultural extension stations, agricultural plant protection stations and manufacture themselves as the auxiliary channels. The original four levels of fertiliser wholesale distribution (national, provincial, regional and county) were reduced to two or even one level with the phasing out of the regional and county levels. State favoured policies for input manufacturers were pursued to ensure adequate fertiliser supply in the markets, but prices have remained relatively high in the last few years (MOA, 1997).

Compared with the reform of Grain Bureau, the transition of agricultural SMC proceeded slowly. Although the ownership of co-operatives was redefined to

collective members, property rights are still not clearly delineated. Co-operative members only have access to make use of the assets to a certain degree in the absence of appropriating the profit return rights and of changing asset rights. The problems of co-operative ownership came after decollectivisation in 1978. Following the household responsibility policy, individual households became the production unit. This meant that the collective-based co-operatives were left hanging in the air without clear subjective, in other words, their ownership remained an abstract concept. The lack of clear legal guidelines not only impedes co-operative development, but the whole agricultural transformation. Therefore a formal Co-operative law calls for a proper definition of co-operatives' property rights and a functioning mechanism. Another reason for the difficulty of SMC transition is its strong connection with industrial sectors, particularly where agricultural inputs are concerned. Shortage of supply was the main reason for the rampant price increase in fertiliser when the market was liberalised in the 1980s. However, most of the input manufacturers are still under government control and even enjoy heavy financial subsidies. In fact, further industrial reforms are needed in order to stimulate the production of agricultural inputs.

Both the Grain Bureau and SMC served as governance and marketing institutions to take care of and implement the relevant policies concerning agricultural production regulation, particularly in the procurement & distribution of agricultural products and delivering agricultural inputs. However, the rigid product circulation systems required immense fiscal support, and the lack of competition in the markets bred serious problems of bureaucracy, corruption and bribery. With the deregulation of agricultural policy, the functions of these institutions gradually declined and they lost their monopoly powers in the market channels. The Grain bureaux have to transform themselves toward the commercial markets and the SMC have to fulfil their original purposes and offer better services for their members.

2.3.4 Newly Emerged Agricultural Markets

New markets for agricultural products in China have emerged and expanded rapidly during the last two decades due to the liberalised marketing policies. The most newly developed spot markets are open markets and wholesale markets. Rural open markets

are the most traditional and popular ones, while urban open markets appeared only in 1979 when the economic reforms were announced. Some large open markets have developed into wholesale markets. There are wholesale markets with national, provincial or regional transaction scope. Futures markets, where transactions for future delivery are executed, have also emerged and developed in particular from wholesale markets.

2.3.4.1 Open Markets

Open markets can be traced back more than 2,000 years in China's history. Some rural open markets are called ' village fair' (*gangji*) when they are periodical. Most are held once every ten days and are set up in large villages or small towns. The development of open markets after the foundation of P. R. China can be separated into the following nine stages (Table 2.3).

Table 2.3 The Development Stages of Open Markets in China

Stages		Contents
1.	1949-1953	Rural open markets freely opened.
2.	1953-1956	Products of Category 1 & 2* were forbidden to trade on the open markets before fulfilling the state procurement quota.
3.	1957-1959	Surpluses from Category 1 and 2 could only be sold to Supply and Marketing Co-operatives, not at the open markets as before. Finally, open markets were shut down.
4.	1959-1966	Open markets were reopened under the state instruction: *huo ri bu luan, guan ri bu si* (lively but not disorder, controlling but not inert).
5.	1966-1977	Culture Revolution period. The frequency of open markets was reduced; some markets were even demolished.
6.	1978 - 1983	Rural open markets were in the recovery period; the first appeared in urban areas.
7.	1984 - 1988	Expansion period for both rural and urban markets.
8.	1989-1990	Adjustment period.
9.	1991 – present	Full development period.

* : See Section 2.2.3 for the definition of category 1 and 2.
Source: adopted from Cai, 1990. p.165.

The first five stages (1949-1977) were the pre-reform periods. The first stage (1949-1953) was the four-year economic recovery period after the Communists took over power in 1949. In this stage, open markets were allowed in order to stimulate agricultural production. The second stage (1953-1956) was when the central planning

economy was introduced. All products in Category 1 and 2 were forbidden to be sold in the open markets before the state quota was filled. The open markets became inactive during this period. Political movements and natural disaster in the late 1960s made the government more concerned about food security and this led to the closing down of open markets in the third stage (1957-1959) during which all product surpluses could be only sold to SMC. After a dreadful period when 30 million people lost their lives from hunger, the open markets were slowly reopened during the fourth stage (1959-1966). The fifth stage (1966-1977) took place during the Cultural Revolution period. Since most of the people were so engaged in political activity, economic activities were partly (sometimes totally) interrupted. Open markets were partly abandoned. As we can see, market activities in China were restricted during most stages, and the development of open markets closely followed government policy.

With the beginning of agricultural reform in 1978, rural open markets began to recover from the destruction of the Cultural Revolution, and urban open markets emerged. Both the number of markets and the transaction values increased steadily during the sixth stage (1978-1983) as shown in Table 2.3. Open markets then experienced a period of expansion in the seventh stage (1984-1988), which was in line with the second wave of reforms in marketing liberalisation. The number of open markets and value of transactions were considerably enlarged. However, the development of open markets slowed down in terms of numbers in the eighth stage (1989-1990). A partial explanation was that the state regulated the over-expanded markets, and some small markets merged to form large ones. However, the transaction values during the adjusting period were not affected. After marketing was further liberalised during the early 1990s, open markets grew again in terms of both the number of markets and the transaction values. For the first time in 1994, the transaction values in the urban open markets surpassed those in rural open markets(Table 2.5, p.36).

2.3.4.2 Wholesale Markets

Wholesale markets in China basically developed in two different ways during the last two decades. Most wholesale markets originated from the large open markets. Some central open markets expanded quickly in terms of both transaction values and

transaction varieties. Since they play an important role in the regional distribution channels, local government at city or county levels encourages the development of wholesale markets from prosperous open markets. The Vegetable Wholesale market that appeared in 1984 in Shangdong Province was the first one to develop from an open market.

The other type of wholesale markets comprises those established after 1990, under direct government instruction and support. Ministries and provincial governments jointly founded them and the distribution ranges are at national or regional level. There are standardised marketing regulations and operational mechanisms. The first formal regulated wholesale market was the Zhengzuo Grain Wholesale Market in Henan Province, which was jointly established by the Ministry of Commerce and Henan government in 1990. This was followed by the Chengdu Meat Wholesale Market in Sichuan province (1991), Jiling Maize Wholesale Market (1991), and so on. There are now some 15 wholesale markets nation-wide initiated by central government (Xu, 1997, p.16). Table 2.6 (p. 37) shows the development of wholesale markets from 1986 to 1995. They steadily grew in both numbers and transaction values in the period up to 1993, with an abrupt expansion in total number and transaction values after marketing was further liberalised in the early 1990s.

2.3.4.3 'Futures' Markets, Transaction for Future Delivery

In contrast to the cash markets where transactions are made for immediate product delivery, futures markets are set up to contract for later delivery of merchandise. China's futures markets are not futures markets in the sense of offering price risk reduction services through hedging, i.e. buying or selling futures contracts to offset the risks of changing prices in the cash markets. Most transactions on Chinese futures markets concern physical trading. Hedging activities can be hardly observed. Future transactions on China's futures markets essentially are forward contracts.

China's first agricultural Futures Market was opened at the Zhengzuo Grain Wholesale market in 1993. Actually, its operation is very similar to an auction market, in which the prices for each individual lot of grain are displayed on a screen and the auctioneer announces the price verbally. The price will be adjusted upward if competitive bidding occurs, or downward if a lack of offers occurs. The traded grain lots are far from standardised in terms of quality, location and delivery time. The

majority of transactions occur on the spot, only a small amount is for future contract delivery. Other wholesale markets, like Beijing, Shanghai and Guangzuo, also started initiating futures transactions following Zhengzuo, but these markets generally did not function as efficiently as they could due to government intervention. In particular, as the government still procures 70 percent of the total grain production, the grain transactions on futures markets were limited and are not attractive to traders. Furthermore, logistic support in the markets is lagging behind and more regulations need to be adapted (Ke, 1995).

2.3.4.4 Discussion

We can summarise China's agricultural markets in the typology presented in Table 2.4. There are three major types of markets: open market, wholesale market and futures market. Four criteria can be used to distinguish them: the market's physical location, the way of transaction payment, construction condition, and the type of buyers involved. Open markets offer daily necessities in a convenient way to individual consumers. They are located close to consumers. Wholesale and futures markets are professional, more complex markets. Their customers are large trading companies, which deal in large transaction values. More logistic support and information technology is required in those markets. A well-developed city infrastructure can be helpful.

Cash payment is predominant in all spot markets, although I-Owe-You (IOU) notes are used in some wholesale markets in case of long-term relationships between dealers. Compared with contracts, IOU notes are informal and more personal agreements. In fact, it is a credit agreement between two parties. Contract paper work can be observed in formal wholesale markets and futures markets. The construction conditions are very simple for open markets. Fixed stalls are the main transaction places. The government defines formal specifications for the construction of wholesale and futures markets, including operational transaction facilities, auxiliary facilities, technical index and information technology.

Table 2.4 Typology of China's Agricultural Markets

Criteria	Open Market	Wholesale Market	Futures Market
Physical Location	town or central village in rural areas, and large neighbourhood in urban areas	large city or provincial capital	provincial capital
Transaction Payment	cash	cash, contract or IOU note	contract
Construction Condition	fixed stall or open area	large hall or transaction house	transaction office
Predominant Buyers	rural and urban consumers	Private traders, individual organisations.	trading companies

As the transition continued, the old functional market institutions, such as the Grain Bureau and SMC, had to be either abolished or transformed. New market activities stimulated the appearance of new market institutions, such as open markets and wholesale markets. This diversification greatly improved the market service quality and the satisfaction of customers' wants and needs. Individual consumers enjoy the convenience of open markets. The advanced marketing institutions, such as wholesale and futures markets, facilitate an efficient product flow, and balance supply and demand nationally.

2.4 General Discussion and Conclusions

Compared with Eastern Europe and former Soviet Union, China is taking a 'gradual' approach to the transition from a planned toward a market economy. Transitions go steadily and quietly, almost without being noticed. The Chinese government did not carry out large-scale privatisation, the most widely used instrument in Eastern Europe. The widely applied method in China's transition is to stimulate people's incentives by assigning different kinds of contracts, such as contracts for land use, contracts for enterprise managers. Contract incentive is one of the characteristics of China's transitional model.

Returning to Williamson's four levels of social analysis, we can summarise China's economics of institutions as presented in Figure 2.3. The ' past' refers to the period from 1949 (when the communist took power) to 1978, while ' present' includes the last two decades of economic reforms.

Figure 2.3 Economics of Institutions in China

Level	Past (1949-1977)	Present (1978-currently)
Level 1: Informal Institutions	Confucianism, Taoism and Buddhism will continue, while western culture is being absorbed.	
Level 2: Institutional Environment	Government policy domination	Rules, laws and policy, mixed economy
Level 3: Governance Structure	Government institutions	Government Agency and market institutions
Level 4: Neo-classical Economics / Agency Theory	Inefficiency	Contract incentive

At the first level of informal institutions, 5,000 years of Chinese history fostered rich traditions and norms, the beliefs or religions of Confucius, Taoism and Buddhism will continue to direct social behaviour while western cultural and life styles are absorbed. At the second level, government policies dominated the rules of the game in the past, when the economy was centrally planned and controlled. The current economy is a mixture of free market and central planning. In addition to government policy, market rules and laws are functioning and better serve market infrastructure for open markets.

The institutional environment imposes constraints on the third level of governance structure. In the past, government institutions, such as the Grain Bureau, were set up to implement corresponding policies. As the transition continues, the old government agencies are being transformed or abolished while new market institutions are emerging. These new market institutions are bringing more freedom in marketers' decision making. Regarding the fourth level of marginal conditions, the distorted price system and income equalisation policy in the past led to inefficient resource allocation (land, labour, capital, etc.) and huge loss of social welfare. The contract incentives are being widely used during the transition from rural farmers to urban managers, and generate great efficiency in terms of both production and resource allocation.

In this chapter, we focused on Levels 2 and 3 where New Institutional Economics is of particular relevance. The framework was applied to analyse the transition of China's agricultural marketing during the last two decades. So what are the consequences of these changes towards agricultural marketing? Does agricultural marketing perform better than before?

Rozelle, et al. (1997) used a data set from 28 provinces across China to study the degree of price integration, one indication of marketing efficiency. The data set includes price series of rice, wheat and maize from 1988 to 1995 and was reported every 10 days from 180 rural periodical markets. The results show a falling price coefficient of variations (CVs) for rice and maize among provinces, one sign of markets' increasing integration. Average rice and maize price differences among provinces also narrow as marketing liberalisation continues. Yu and Huang (1997) used the same data set to analyse price cointegration. They compared pairs of markets during different periods. The results show an increasing degree of cointegration between markets. The pairs of cointegrated markets were only 10 at significant level (5%) during 1988-1989, while the number steadily increased to 17 during 1994 to 1995. The above result indicates that, as the marketing liberalisation continues, markets tend to become more transparent and efficient.

The two decades of transition not only liberalised markets and increased marketing efficiency, but also better met consumers' needs and demands by offering high quality products with a wide variety of choices. The reforms have not only liberalised agricultural production and the adoption of new varieties and technology for high quality products, but have made them available to consumers through the liberalisation of markets. Consumers now have abundant choices even for most perishable products at the markets. When compared with the supply shortage during the product regulation periods, no major complaints are expressed about the rich supply of agricultural products in the markets nowadays.

The marketing service has also improved. The marketing structure was stiff and inflexible during the pre-reform period. State-owned agents monopolised marketing channels, such as the Grain Bureau, SMC and other state commercial companies. However, two decades of reforms have changed the marketing structure and caused fundamental changes to the distribution system. Tens of thousands of open markets and wholesale markets are developing in both rural and urban areas to better service consumers' demand.

Figure 2.4 Economics of Institutions

Level	Frequency (years)	Purpose
L1 Embeddedness: Noncalculative Informal Institutions, Customs, Traditions, Norms Religion	10^2 to 10^3	Often Spontaneous
L2 Institutional Environment: Formal rules of the game-especially property (polity, judiciary, bureaucracy)	10 to 10^2	Get the Institutional Environment Right. 1st-order Economising
L3 Governance: Play of the game -- especially contract (aligning governance structures with Transactions)	1 to 10	Get the Governance Structure Right. 2nd-order Economising
L4 Resource Allocation and Employment (prices and quantities; incentive alignment)	Continuous	Get the Marginal Conditions Right. 3rd-order Economising

L1: Social Theory;
L2: Economics of Property Rights;
L3: Transaction Cost Economics;
L4: Neo-classical Economics/Agency Theory

Source: Williamson, 1998.

Table 2.5 The Development of China's Open Markets from 1961 to 1997

Year	Number of open markets [a]		Transaction Values (100 million yuan)[b]	
	-- Urban	-- Rural	-- Urban	-- Rural
1961		41,437		137.0
1962		38,666		164.0
1963		38,468		105.0
1964		38,082		78
1965		37,000		68
1974		32,000		114.0
1975		31,000		105.5
1976		29,227		102.0
1977		29,882		105.0
1978		33,302		125.2
1979	2,226	36,767	12.0	171.0
1980	2,919	37,890	24.0	211.7
1981	3,298	39715	34.0	253.0
1982	3,591	41,184	41.0	287.0
1983	4,488	43,515	51.0	328.0
1984	6,144	50,356	75.0	382.0
1985	8,013	53,324	120.4	511.6
1986	9,701	57,909	244.4	662.1
1987	10,908	58,775	347.1	810.8
1988	12,181	59,178	545.3	1,076.0
1989	13,111	59,019	723.6	1,250.0
1990	13,106	59,473	837.8	1,330.4
1991	13,891	60,784	1,079.2	1,543.0
1992	14,510	64,678	1,583.0	1,947.0
1993	16,450	66,551	2,562.4	2,780.6
1994	17,894	66,569	4,569.1	4,412.4
1995[c]	19,892	63,000	6,176.4	5,413.7
1996[c]	20,832	64,559	7,882.5	6,812.4
1997[d]	25,371	67,309		

a. Market Statistical Yearbook of China, 1996; b. China Yearbook of Industry and Commerce Administration, 1995; c. China Yearbook of Agriculture, 1997; d. Rural Statistical Yearbook of China, 1998.

Table 2.6 The Development of China's Wholesale Markets from 1986 to 1995 [a]

Year	Number	Transaction Values (100 million yuan)
1986	892	28.35
1987	1,095	50.34
1988	1,224	70.59
1989	1,313	95.23
1990	1,340	115.79
1991	1,509	153
1992	1,858	224
1993	2,081	347
1994[a]	2,471	682.09
1995[a]	3,517	1,422.4

a. Market Statistical Yearbook of China, 1996.

Xu, 1997. Source: State Bureau of Industry and Commerce Administration.

CHAPTER 3

THE SWEETPOTATO ECONOMY IN SICHUAN

This chapter concisely reviews the changing role of sweetpotato in the economy of Sichuan Province through three different stages, designated 'the pre-communist period', 'after the foundation of P. R. China' and 'since the economic reform'. The development of sweetpotato production and processing will be elaborated for each stage. The purpose of this chapter is to demonstrate how the sweetpotato economy has changed during the different periods, in response to the economic transition as described in Chapter 2. In addition, this chapter gives background information about the sweetpotato economy, which is useful for later chapters.

3.1 The Pre-communist Period (before 1949)

3.1.1 Production

Sweetpotato in China is given different names. Sichuan people call it '*hongshao*', which means 'red root'. The earliest formal record of sweetpotato in Sichuan appears in the book 'Annals of Sichuan' edited in 1733. One legend is that a Cantonese introduced sweetpotato to Sichuan from his hometown when he worked as a Sichuan officer. Sweetpotato played a very important role in the food security of Sichuan Province. Early this century sweetpotato production ranked second in importance amongst food crops in Sichuan, next to rice. During the natural disaster year of 1786, the Qing dynasty advocated the cultivation of sweetpotato to avert catastrophe, owing to its high yield and strong fertility. Sweetpotato soon spread over Sichuan Province and became the main staple food second in importance only to rice.

Figure 3.1(p.53) presents the trend of sweetpotato sown area, yield and production from 1931 to 1996. During the pre-communist period (1931-1949), the general trend of sown area was upwards. It was 388,000 hectares in 1931, and by 1938 the sown area had increased to 858,000 hectares. The following few years showed a distinct drop. Both yield and production varied considerably during this period.

3.1.2 Production Location

Sweetpotato cultivation areas in Sichuan Province are normally located 1,000 metres above sea level, but high yields usually are obtained below 500 meters above sea level. The planting areas are surrounding the Sichuan Basin and can be divided into three geographic areas.

a. Centre and West of the Sichuan Basin. These areas are located in the central and west of the Sichuan Basin and are most productive for sweetpotato cultivation, with fertile land and temperate climate.

b. South and East of the Sichuan Basin. The region is scattered around the Yangzi River. The earlier spring in this area provides good conditions for early sweetpotato seedlings, but the traditional cultivation method makes yields lower here than in the central basin.

c. Boundary Region of the Sichuan Basin. The barren and steep land of this area is not conducive to sweetpotato production. The yield of sweetpotato in these areas is the lowest in Sichuan province. The use of agricultural plastic film is promoted for sweetpotato production, but the extension work is constrained by the farmers' poor financial situation and lack of credit.

3.1.3 Sweetpotato Variety

There were hundreds of local sweetpotato varieties in Sichuan at the beginning of the century. In 1940, Mr. Yong Hongzhu of Sichuan Institute of Agricultural Sciences first introduced the American variety *NanRuiShao (NRS,* Nancy Hall*)* to Sichuan and then distributed it across China. By 1973, 42.4% of sown areas in Sichuan were planted with NRS variety (ASP, 1996).Thereafter, its dominant position declined as the variety deteriorated and its roots became smaller. A Japanese variety *ShenLiBaiHao (SLBH)* replaced NSR and soon became popular in Sichuan. SLBH was first introduced in China in 1941 and became the main variety in Sichuan by the end of 1970s. These foreign varieties improved the sweetpotato production of Sichuan province. The yield of the two new varieties was 30% higher than traditional local varieties.

3.1.4. Processing and Marketing

The history of sweetpotato processing in Sichuan can be traced back more than a century. Some families in the survey reported that they have been engaged in processing activities for more than three generations. Although there is not much information available about sweetpotato processing and marketing before the pre-communist period, it was mainly a subsistence economy in the earlier years, since for thousands of years, the common form of agricultural production in China was the family based independent farming system. Farmlands were fragmented and could only meet subsistence needs on the small lots of land. Farmers had to plant sweetpotato as their staple food. Some of them might have learned to process sweetpotato into starch or noodles. They might also have sold the processed products in the rural fairs. Given the small scale of processing and the less developed marketing system, the processing was mainly for self-consumption, or meant to be exchanged for other products, such as eggs. In one sentence, during the pre-communist it was a subsistence economy, in which sweetpotato was the main staple food, and processing and marketing activities were underdeveloped.

3.2 After the Foundation of P. R. China (1950s to 1980s)

3.2.1. Production

After the take-over of the communist government, a spiked expansion of the sweetpotato economy occurred during the late 1950s. This trend was obviously enhanced by the Chinese famine of 1958-61. The misconduct of agricultural collectivisation, together with natural disasters - massive flooding and lasting drought (Lin, 1990), led to the most severe catastrophe in human history. About 30 million premature deaths occurred in China during that period (Ashton, et al. 1984). Sichuan was one of the most severely affected regions and its population dropped from 71 million in 1957 to 65 million in 1961 (EGS, 1985). Sweetpotato production reached its historical peak in 1958 with 1,802 thousand hectares under cultivation (Figure 3.1 p. 53), and saved millions of Sichuanese lives. Thus the familiar Sichuan proverb: 'although you have rice nowadays, do not forget the sweetpotato!'

Historically, Sichuan is the main food supplier to other grain deficit provinces. During the first five-year planning period (1953-57) under the communist regime,

27% of compulsory purchased grain was shipped out of Sichuan, accounting for one third of national grain movement amongst food deficit provinces (Luo and Li, 1995). Although there are no formal records of sweetpotato shipments, it is certain that sweetpotato belonged to Category 1 (crops in Category 1 were strategically important for the national economy and their production was planned by central government, see Chapter 2). Sweetpotato was converted into grain at a ratio of 4:1 for food ration and animal feed during the central planning periods. In remote areas, the proverb of 'sweetpotato is half-year grain' can be still heard. The difference between sweetpotato and other crops of Category 1 was the procurement policy due to its perishable character. As a Category 1 crop, sweetpotato production was centrally planned in Sichuan. However, unlike other crops in Category 1, the government's food agency 'Grain Bureau' normally did not procure fresh sweetpotato roots. Dried chips were procured mainly as animal feed. In the food shortage years, particularly the famine periods of 1958 to 1961, the Grain Bureau in Sichuan did purchase fresh roots from farmers and shipped the products to urban areas as food ration. This generally occurred in September and October when sweetpotato was harvested. Urban residents could purchase 4 kg sweetpotato on the presentation of a 1 kg grain coupon, and the proportion of sweetpotato in the total food supply was kept lower than one quarter of the residents' grain ration (Source: personal communication with retired Grain Bureau officers).

During the ten years of the Cultural Revolution (1966-76), sweetpotato production in Sichuan stabilised at around 3 to 3.5 million tons and sown areas decreased to less than 1,400,000 hectares. In the later 1970s, the Sichuan government enjoyed more flexibility from the central government to adjust its agricultural policy and made sweetpotato production one of its provincial development strategies, after successive drought years had heavily affected the paddy crop production. The policy was 'Let's go through the dry path when the water path is not passable'. The government explored and promoted a series of improved sweetpotato cultivation technologies, newly bred varieties and improved storage methods to stimulate sweetpotato production. In 1979, sweetpotato production reached the record level of 5.47 million tons.

3.2.2 Variety

Farmers normally keep their harvested sweetpotato roots as next year's seeds. Year by year, the sweetpotato yields decline due to diseases and changing production conditions. A newly bred variety can be only utilised for 8 to 10 years, and then it tends to deteriorate. In the 1970s, with the deterioration of existing varieties, two new varieties were adopted in Sichuan province. One is *called ChuanXu 27 (CX 27)* bred by Sichuan Academy of Agricultural Sciences. Farmers welcomed CX 27 due to its higher yield and its abundant vines, which stimulated and encouraged backyard pig raising in Sichuan Province. The other one *XuShu 18 (XS 18)* was bred by Jiangshu Academy of Agricultural Sciences and was first introduced to Sichuan in 1977. Yields are 39% higher than the *Japanese variety* SLBH (Sheng and Wu, 1990). These locally bred varieties (*CX27 and Xushu 18*) had almost displaced the foreign varieties in Sichuan by the 1980s, owing to their high yields. XS 18 has also been widely adopted in the other main sweetpotato producing provinces, e.g. Shandong, Henan and Anhui. It is now the most well known sweetpotato variety in China.

3.2.3 Crop Rotation System

Sweetpotato production in Sichuan Province was mainly a one-crop system before 1970s, although rotation of sweetpotato with beans, sesame or maize could be found occasionally. However, *since* the sharp population increase in the 1960s and 1970s put high pressure on the food supply, a series of complex crop rotation systems have been explored in Sichuan to relieve the pressure on the limited availability of land. The Wheat-Maize-Sweetpotato (WMS) inter-cropping system is a typical example. When wheat is planted in November, only every other line is sown and the other half is kept for maize in the early April of the following year. Of course, some small crops, like green fertiliser or vegetables, can be planted and harvested before sowing maize. After wheat is harvested in May, it is time to plant sweetpotato in the wheat lines. Only sweetpotato is left when the maize is harvested in August. The rotation system takes full advantages of the land availability and the light and heat conditions required for the three crops. The WMS crop rotation system was awarded First Prize by the

Ministry of Agriculture and was then promoted in other southern provinces. The whole rotation system is illustrated in Table 3.1.

Table 3.1 The Calendar of Wheat-Maize-Sweetpotato Rotation System

Crops	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct
Wheat													
Maize													
Sweet Potato													

▨▨▨ : crop planting season: ▥▥▥ : crop growth and harvest season

Although the WMS system reduces wheat-sown areas by half, farmers are still able to harvest 70% of the original production given the marginal advantage of the rotation system. Furthermore, the grain production per hectare is much higher than previously. In 1994, the WMS crop system accounted for more than 40% of the total sweetpotato sown area (SSA, 1995). Because of the diversified geographic conditions, many other sweetpotato rotation systems can be found in Sichuan Province, including rotations of wheat-peanut-sweetpotato; bean-maize-sweetpotato; potato-maize-sweetpotato, and so on. Limited arable land and dense population in Sichuan Province are the main reasons for the existence of these complex rotation systems.

3.2.4 Storage

Because of the perishability of sweetpotatoes, storage has always been problematic. The most common diseases of sweetpotato are 'black pot' (*Ceratocystis fimbriata*) in temperatures above 15^{0}C, and 'soft rotten' (*Rhizopus Nigricans*) in temperatures below 8^{0}C. There are a number of traditional storage cellars for sweetpotato in Sichuan. Cliff cellars are built inside of large cliffs in the mountainous areas; bamboo cellars are dug in the bamboo forest. Container cellars are normally dug inside farmers' own houses. Although these cellars are designed to maintain suitable temperatures and moisture levels, the spoilage rates are 30%, and sometimes even as high as 50% (Source: personal communication with SAAS scientists).

In the 1970s, by examining the storage methods from the north of China, Sichuan agricultural researchers adapted a storage method called 'Large Room Cellars' and promoted it widely. As its name suggests, the 'Large Room Cellars' are built like

large rooms with controllable heater pipes inside, and are collectively owned. Sweetpotatoes are placed in layers inside the room. The room temperature is immediately raised to 38^0C and kept constant for two days in order to kill the disease bacteria. On the third day, the room temperature is reduced to the safety temperature, which is between 11^0C and 14^0C. The spoilage rate using this method can be kept below 5%. The number of 'Large Room Cellars' reached 32,770 by 1976, each with a storage capacity of 3 to 3.5 tons (ASP, 1996).

After the introduction of the Household Responsibility System, some 'Large Room Cellars' were destroyed or converted into small ones. In recent years, individual households have built their new 'Large Room Cellars' for multiple usage: for seedlings in spring, for silk and cocoons in summer, for rice in autumns and for sweetpotato in winter. Chemicals, like *thiophanate methyl* and *bavistan*, may also be applied for sweetpotato storage, reducing losses by 15% - 30% (Timmins and Marter, 1990).

3.2.5 Processing and Marketing

After the communist government took over China's economy in 1949, private enterprises were confiscated. Sweetpotato processing activities at the individual household level were not encouraged. Only newly set-up agricultural co-operatives or state-owned factories were allowed to operate sweetpotato processing. The starch was mainly produced as industrial raw material and its circulation was among different state owned factories under government orders. The processed noodles were primarily supplied to urban consumers and were distributed along the government-controlled channels. Consumers could only find and purchase sweetpotato noodles at the state shops. Despite the strict restrictions by government, some farmers reported that they still processed sweetpotato noodles secretly and sold them on the black market during the command economy period.

3.3 Since the Economic Reform (onwards 1980s)

3.3.1 Production

As can be seen in Figure 3.1, sweetpotato sown area and production decreased during the early 1980s. The sown area declined from 15.7 million hectares in 1979 to 12

million hectares in 1985, while the production declined from 5.47 million tons to 3.94 million tons during the same period.

Several reasons contributed to the decline of sweetpotato production in the 1980s. First of all, the importance of sweetpotato in Sichuan food security was reduced as the hybrid varieties of other crops, mainly rice, brought enormous increases of grain production during the 1980s (Lin, 1998). At the same time the government gradually *loosened* its control on sweetpotato production. By the 1980s, sweetpotato ranked fourth in importance in Sichuan Province, after rice, wheat and maize. These four crops now make up more than 90 percent of the food crops supply in Sichuan and about 80 percent of sown area. Rice is the main crop and accounts for almost half of the grain production, while wheat and maize account for more than 30 percent of the grain production. The percentages of the sown areas of these crops show a steady increase through the years. The production of sweetpotato accounts for some 10 percent of the total grain in Sichuan (SSA, 1996). By the 1980s sweetpotato was no longer a staple food in Sichuan Province. It is increasingly becoming a crop which is used as an input for processed food or animal feed. Although sweetpotato was once strictly cultivated under provincial planning to ensure food security, it is becoming a 'free' crop as the reform continues.

The decline of sweetpotato planting areas was also caused by industrial expansion – a substantial amount of agricultural arable land became used for industrial construction plots as the Chinese economy was boosted. Comparing the sown area in 1988 to that of the first reform year in 1979, the arable land occupied for industrial use is 298,000 hectares for sweetpotato, 92,000 for rice, 362,000 for wheat and 179,000 for maize in Sichuan Province (MOA, 1989). Another reason for the decrease in sown areas of sweetpotato is its weak competitive position in the markets. The further market liberalisation allows farmers to allocate their limited arable land to more profitable crops. Sweetpotato has less market value compared with other cash crops, such as tobacco and rapeseed, which are more profitable for farmers. The reforms give farmers more flexibility to allocate their land to competing crops. The sown areas of cash crops in Sichuan Province have increased from 1 million hectares in 1978 to 1.43 million hectares in 1995 (SSY, 1996).

The effects of economic reforms on the sweetpotato economy are manifold. Economic reforms have also brought new opportunities for sweetpotato production. In particular, a rising demand for livestock feed has stimulated sweetpotato production.

The rising standard of living accelerated the retreat of inferior goods and stimulated the consumption of luxury goods, like meat. As a traditional pig-raising region, Sichuan pork production expanded sharply during the reform period. The pork production increased from 1.14 million tons in 1980 to 6.61 million tons in 1996. The pork consumption per capita in Sichuan increased to 23.3 kg in 1996 compared to11.7 kg per capita in 1980 (SSB, 1996).

3.3.2 Variety

By the late 1980s, another variety *NanXu 88(NX 88)* bred by NanChong Agricultural Institute in Sichuan Province partially replaced *XS 18* and *CX 27*. The yield of NX 88 is 20% higher than XS 18 (Sheng and Wu, 1990). Because of its wide geographical suitability and popular taste, NX 88 is now the leading variety and accounts for almost half of the sown area in Sichuan. A new variety *ChuanXu 1* bred by Sichuan Academy of Agricultural Sciences in 1996 is still at the trial stage. Its yield was 10% to 40% higher than NX 88 in different experimental stations in 1996. It could be a prosperous variety due to its high yield.

The currently available varieties are of the food and livestock feed types. Their main indexes focus on the sugar content, yield, and vine production. However, as the role of sweetpotato changes from fresh consumption to raw material for the processing industry, more diversified varieties will be needed. The content of starch and dry material should be given more attention when breeding new varieties in the future.

The cultivation areas of different varieties in 1997 and their historical record in Sichuan Province are presented in Table 3.2.

Table 3.2 The Cultivation Area of Main Sweetpotato Varieties in Sichuan

Varieties	In the Year of 1997 [a]	Historical Record of Cultivation Areas [b]	
	(10,000 mou)	Year	Area (10,000 mou)
NRS(Nancy Hall)	200	1973	886
SLBH	N.A.	1980	514
CX 27	300	1988	463
XS 18	400	N.A.	
NX 88	500	N.A.	

a: Data offered by Sichuan Academy of Agricultural Sciences; b: Cited from Sheng and Wu, 1990.

3.3.3 Processing[2]

Sweetpotato processing activities have been greatly encouraged at the household level since the 1980s. The expansion of the processing activities can be separated into three stages. The first stage started with the decentralisation policy of Chinese agricultural reform announced in the late 1970s, which allowed farmers more freedom in agricultural production, and abolished the restrictions on private marketing activities. Farmers started to process sweetpotato starch and noodles without being punished. At this stage, the noodles were mainly produced manually and the processing scale was small. The second stage, parallel to the second wave of economic reforms, started in 1985 toward a more liberalised market system. After the one-time discrete impact from institutional changes of HRS, the increase in farmers' income began to slow down in the late 1980s (Lin, 1992). In order to encourage the development of the local economy and generate income sources for farmers, local governments in Sichuan Province were actively involved in stimulating sweetpotato processing and marketing. Strategies included setting up new village markets for sweetpotato noodles, improving farmers' processing technology, developing processing machinery, and so on. Since 1985, more farmers have joined the sweetpotato processing activities and the market outlets have expanded.

The most exciting opportunity for the sweetpotato economy came in the third stage of the processing expansion in the 1990s. After the initial institutional reforms and marketing liberalisation, the government sought new waves of policies to push the growth of the agricultural economy to a higher level. When the central governments advocated the development of agribusiness (*chanyehuo*) as a new pivot to generate income for farmers, the Sichuan government began to pay even more attention to the sweetpotato processing sector. Developing local agribusiness is now strongly promoted at all levels of governmental administration. Given the popularity of sweetpotato processing activities at household level, the Sichuan government adopted a series of policies aimed at encouraging sweetpotato processing businesses. These policies include favourable loans for processing industry, financial support for

---

[2] This section is mainly focusing on sweetpotato processing at household level since sweetpotato processing at manufactories level is rather limited. More information about starch industry can be obtained from Appendix 1.

processing related R&D activities, and public promotion of the sweetpotato industry. At this stage, processing scales have increased and private agribusiness is emerging. These developments provide a unique opportunity for sweetpotato production and strengthen sweetpotatoes' competitive position amongst crops.

Machinery

Corresponding to the sweetpotato processing procedures, a series of processing machinery has been designed and manufactured in Sichuan since the 1980s. These include sweetpotato washing machine, grinding machine, starch-purifying machine, dough-making machine and noodle extruder machine. A household processing survey was conducted during this study and more details can be found in Chapter 4. The results show that the most widespread machine is the grinding machine; 87.4% of the surveyed household own a grinding machine. Others who do not own one send their sweetpotato roots to be smashed and then pay a grinding fee for it. However, only a small number of households own all three types of machines: washers, grinders and extruders.

Processing Procedures

The processing procedures vary according to region and the types of machinery farmers own. However, there are four basic steps: grinding - sedimentation - purification - extraction. After the sweetpotato is washed manually or mechanically, the roots are ground. When a grinding machine is used, starch slurry will be directly separated from the fibrous residues. Otherwise, another procedure, 'sieving', is needed to separate starch. Normally a big tank is used to precipitate starch. A new sedimentation method developed by a large-scale processing farmer is called 'long-trough-flow'. In the 'long-trough-flow', starch slurry goes directly to the 100 metre-long trough after grinding. At the end of the flow, only clear water is left, while starch is sedimented along the trough. The raw starch mud contains soluble impurities, grit and so on, necessitating the starch purification procedure. The most popular method is adding alkali material to purify starch while another biological method called 'Sour Liquid' is also used in Sichuan. The sour liquid is fermented liquor from peas or broad beans. Although SAAS is trying to promote this method, only some large-scale processing households have adopted it, since it is difficult for

farmers to keep the acidity at its optimal pH value of 3 to 4. Making the desired starch dough also requires skilled noodle extrusion. Semi- and fully mechanical extruder machines are available in Sichuan. However, the majority of farmers still use the traditional manual saucepan-type extruder. Drying noodles normally takes 1 or 2 days. Some large-scale processors have already built drying houses to avoid the frequent rain in Sichuan.

Seasonality
Sweetpotato processing activity shows strong seasonality. The survey shows that the earliest processing activities start in August when the early varieties of sweetpotato are harvested. More than half (51%) of the processing households begin their processing in October, the normal harvest season for sweetpotato in Sichuan. The second largest participation is in November. 40% of households finish their processing activities by January according to the field survey. Therefore the most concentrated period is the three months from October to November.

Large-scale farmers produce noodles all year round. They buy wet or dry starch from other households, villages or even from other provinces. Suitable storage methods can keep starch for a year and thus ensure a constant supply for sweetpotato noodle production. Sweetpotato processing is also affected by other agricultural activities. For example, during the rice harvest season, sweetpotato processing activities are constrained by the shortage of labour because farmers are engaged in the very time-consuming activity of rice harvesting. The processing seasonality is shown in Table 3.3.

Table 3.3 The Seasonality of Sweetpotato Processing

Month	5	6	7	8	9	10	11	12	1	2	3	4
Production		plant	growth		harvest							
Processing	Mainly large scale processors					Most intensive		Relatively intensive			Less intensive	

3.3.4 Marketing

Since the 1980s, sweetpotato marketing has changed dramatically. Collectives and state-owned processing factories were either dissolved or rented by individuals due to

their inefficient operation and mismanagement. The function of the state shops also withered because of their inflexibility. In contrast, private marketing actors are thriving and are active in the marketing channels. These new marketing actors not only include household processors, but also private collectors, wholesalers and retailers. Compared with the inflexible distribution system in the planned economy period, the marketing channels are becoming more diversified. Thousands of open markets and wholesale markets have been established and can provide better services to consumers. More details about the sweetpotato marketing system will be discussed in Chapter 7.

3.4 Discussion

From the historical review of the sweetpotato economy in Sichuan, we can observe its changing role from a source of food security towards a source of income generation. Table 3.4 presents the differences in sweetpotato utilisation during the last half century. In the early 1930s, 80% of sweetpotato was consumed as food, 10% as animal feed and the remaining 10% as seed etc. In the 1970s, the proportion for food consumption dropped to 60% while that for feed increased by 20%. Rapid changes were observed in the 1980s, when 65% of sweetpotato was used as animal feed while only 20% for fresh consumption. The proportion of sweetpotato used for processing increased to 10% and this trend is continuing to grow. Therefore, sweetpotato as a staple food in Sichuan Province had almost ended by the 1980s, and the trend shifted towards animal feed and processing.

Table 3.4 Sweetpotato Utilisation in Sichuan Province

Period	Food (%)	Animal feed (%)	Processing (%)#	Other (%)
1930s	80	10	*	10
1970s	60	30	5	5
1980s	20	65	10	5

*: Marginal levels of processing may be included under food use.
#: Processing includes food products.
Source: Timmins and Marter, 1990.

Table 3.5 summarises the transformations in terms of sweetpotato production, processing and marketing during the different historical periods. As already discussed in this chapter, three different stages are distinguished.

Table 3.5 The Evolution of Sweetpotato Production, Processing and Marketing in Historical Perspective

Period	Production	Processing	Marketing
Pre-communist Period (before 1949)	Unit: independent family farm; Purpose: staple food	Limited processing activities at family level	Outlets: village fairs; Actors: individual farmers
After the foundation of P. R. China (1950s-1980s)	Unit: Agricultural collectives; Purpose: food security	Processing only at collective level, Individual household forbidden	Outlets: state controlled shops; Actors: co-operatives, Grain Bureau, and other state agencies
Since the Economic Reform (after 1980s)	Unit: individual household; Purpose: income generation	Dominated by individual households	Outlets: open markets and wholesale markets. Actors: farmers, private traders

The pre-communist period covered the two hundred years after sweetpotato was first introduced into Sichuan Province in the 18th century. During that period, the Chinese economy was still at a subsistence stage, family farms were operating independently and sweetpotato served as the main staple food. Very few families processed sweetpotato, and the processed starch or noodles were exchanged at the village fairs. The second stage covers the command economy period after the communists took over power. During this period, individual households were members of collectives or communes. Detailed planning for sweetpotato production was made by the government and was implemented at commune level. Only agricultural collectives or state owned factories were authorised to carry out sweetpotato processing activities. The distribution of the processed products flowed along the government controlled marketing channels. Agricultural co-operatives, the Grain Bureau, state- owned factories and other state agencies were legal actors in the markets, and no private marketers were allowed. The third period started with the institutional reforms of the Household Responsibility System in rural China. Individual households once again became the independent production units and the government gradually lost its control over sweetpotato production. Private processing and marketing activities were encouraged. Individual households came to dominate sweetpotato processing activities. In the meanwhile, marketing outlets, such as open markets and wholesale markets, developed well. Private marketing actors can now easily enter or exit these markets.

Figure 3.1 Sweetpotato Production in Sichuan Province from 1931 to 1996
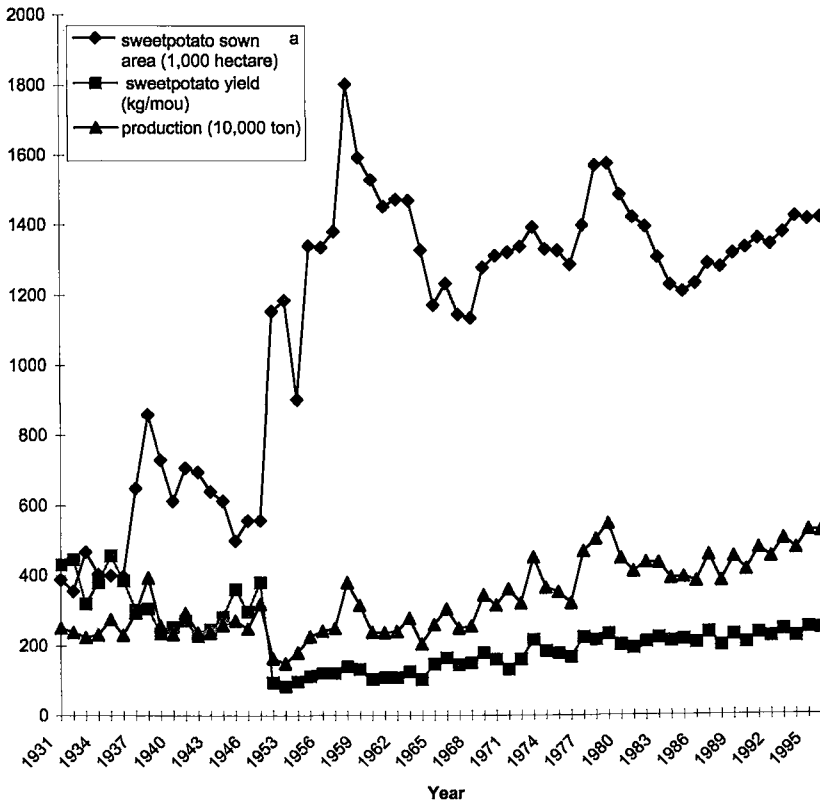
Note: 1 hectare = 15 mou

CHAPTER 4

DATA COLLECTION

4.1 Introduction

In order to investigate the research questions proposed in Chapter 1, data were collected from a survey of various actors in the sweetpotato marketing channel, in particular producer/household and consumers, as well as some additional secondary data. As mentioned before, the area analysed is Sichuan, given the significant position of sweetpotato in this province. Our empirical study aims to analyse the processes and developments at stake in the transition from a planned toward a market economy. It hopefully offers insight into how to improve the understanding of critical factors in such a transition.

This chapter mainly describes how the primary data are collected, which includes the procedures to obtain sampling frames, questionnaire design and conducting the survey. Secondary data collection is also briefly mentioned at the end.

4.2 Sampling Frames

To help understanding the sampling procedure, it is useful to have a clear picture about Chinese social hierarchy structure. Contrary to expectations, China has a good and reliable sampling frame. Chinese population data can be grouped by age, sex and profession. Numbering of dwelling units is available down to the street level in cities, and to village level in rural areas.

Since the research project focused on Sichuan Province, Figure 4.1 presents the administrative structure of the rural area in Sichuan Province. The administrative structure in the urban area is comparable to that of rural area but relatively simpler. As can be seen in Figure 4.1, the individual household is the basic social unit; villages consist of anything from a few to hundreds of households; dozens of villages constitute a rural community - the lowest administrative level in rural China and a county is built up on these communities. The province has dozens of regions that comprise a number of counties and cities.

Figure 4.1 The Administrative Structure of Sichuan Province in Rural Area

	Size:
Sichuan Province	
........., Region, ...	(total 23)
....., County, ...	(total 219)
........., community, ...	(total 3,987)
......., village, ...	(total 76,081)
........., household, ...	(total 26,212,000)
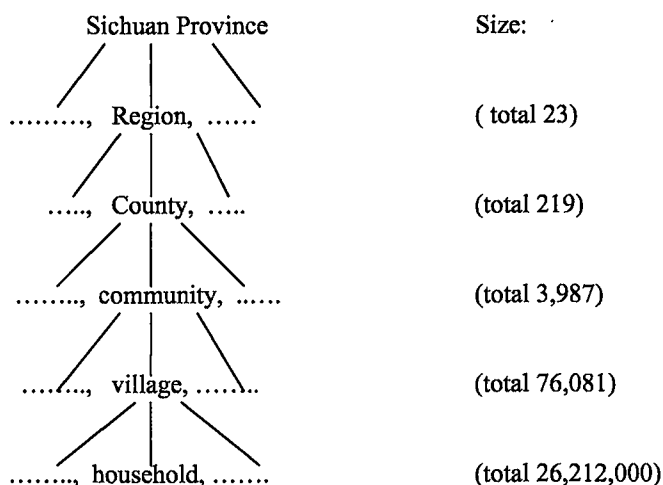
Source: Statistical Yearbook of Sichuan, 1995.

In order to be able to use the data statistically, a number of 150 respondents is normally required to ensure a quantitative analysis significant at 95% level (Luck and Rubin, 1987). The specified sample sizes for processing household, consumers and starch industries are presented in Table 4.1. We will discuss the samplings for consumers and processors in the following sections.

Table 4.1 The Sample Size of Surveys

Surveys	Sample size		Activity locations	Executors
	Planned	Actual		
Rural Processing Households	150	128	Santai and Anyue counties	Author & 10 trained local officers
Rural non-processing households	0	85	Santai and Guangan counties	Author & 5 trained local officers
Individual Consumers	200	Urban: 104 Rural: 157	Chengdu and Anyue	Author & 18 statistical officers and trained students
Starch producer industry	10	4	Chongqing, Neijiong and Santai	Author
Starch users industry	80	15	Chengdu, Neijiong and Anyue	Author, students and statistical officers.

4.2.1 Sampling of Sweetpotato Processing Households

Santai and Anyue counties were chosen for household processing sampling as mentioned in Chapter 1. The local statistics bureau of the two selected counties offered a list of names of communities with sweetpotato processing activities. 17 communities were randomly selected by taking the fifth card from the sampling frame after shuffling the named cards every time. At the community level, the same approach was used to choose the villages. In the end, 27 villages in each county were chosen for the survey. Individual processing households within a village were systematically selected. In this method, interviewers chose one household as a starting point, then selected one in every other five households. Interviewers were welcome in rural households. However, the job was more time consuming than expected. Some villages were only accessible by foot. It also took a long time to transfer from one processing household to another, especially in the hilly villages.

We did not originally intend to interview non-processing households. However, when conducting interviews with processing households, the idea came into mind that it would also be interesting to obtain information from non-processing households for comparative study. Therefore, the same questionnaire as for the processing households was given to non-processing households who were asked to answer all parts except the processing sections. In the end, a total of 85 sweetpotato non-processing households were surveyed in Guangan County, where sweetpotato resources are rich, but processing activities are hardly found.

4.2.2 Sampling of Individual Consumers

Urban Consumers

The urban consumer survey was conducted in the provincial capital city Chengdu as it has a large population and is the main consumption centre. A proportional stratified sample was drawn, in which the chosen number of respondents in each stratum was proportional to its share of the total population (Luck and Rubin, 1987). Chengdu City consists of five districts, and each district has numbers of aggregated communities, which consist of a certain number of streets. The demographic data for the city were obtained from the Chengdu statistics yearbook. Firstly, the population data of the five districts were gathered and the proportion of population to be used in the survey for

each district was then calculated. It was estimated that 20 communities were enough to ensure the representativeness of the 80 communities in Chengdu City. Twenty communities were then allocated among the five districts according to their population share. Within a selected community, 5 households were sampled to make up the total of 100 urban respondents. For the twenty selected communities, interviewers were free to choose any household as a starting point and then systematically selected every other 10 households for the interview. It was soon found out that the weekend or evening was a better time to find people available than during the day. In the end, the total number of contacted households was 219, including 37 refusals, 78 nobody at home and 104 successes. The refusal rate was 16.9%. Most of those who refused were old people.

Rural Consumers

In order to avoid the bias of processing activities on local consumers, it was decided to exclude the processing communities from the rural consumer survey. In Anyue County, five non-processing communities were randomly selected from the available lists offered by county statistical office. Four villages were then randomly sampled in each selected community. The interviewers together with village leaders went to households and invited the persons in charge of buying food to assemble in a large room. In the assembling room, the interviewers distributed the questionnaires and then explained how to answer, or read questions for illiterate interviewees. The interviewees were not allowed to talk to each other before they finished their questionnaires. Similar procedures were conducted for the rural consumers in Chengdu area. The refusal rate was 7%, while the number of successful interviews was 157.

4.2.3 Sampling of the Starch Industry

The survey of the starch using industry was the most problematic because of the overestimation of the number of starch industries during the research design stage. First of all, there is no sampling frame available for the starch industry. The planned survey size of the starch industry was overestimated given the limited number of starch industries in operation. Secondly, the high cost and the lack of co-operation from the industry made it very difficult to carry out a large survey within the

scheduled time and available budget. After consulting experts from the starch association and food association of Sichuan Province, it became clear that the starch producing industry mainly produces maize starch while sweetpotato starch producers can hardly be found. The medical and food industries are the main starch users in Sichuan. Unfortunately, the register of starch users mentioned by their association is incomplete and could not serve as a sample frame. In the end, 15 starch using factories are planned to be interviewed. Sampling began from the medicine and food sections in Chengdu's industry telephone catalogue. 12 medical manufacturers and 9 food factories were contacted. However, due to several reasons (shown in Table 4.2), only five starch using manufacturers were successfully interviewed. In order to try and meet the planned total of 15 respondents, all industrial sectors that might possibly use starch were contacted beside medicine and food. These included the papermaking, textile and painting industries. After finishing 9 interviews in Chengdu, it was very difficult to find more. Therefore, the remaining interviews were carried out in Neijiong City and Anyue County. A report based on the survey of starch industry is attached in the Appendix 1 at the end of the book.

Table 4.2 Sampling of the Starch Using Industry

Location	Sectors	Total contacted samples	Successful interview	Refusal interview	Closed down	Do not use starch	Other reasons
Chengdu	Medicine	12	5	4		3	
	Food	13	3		2	8	
	Paper-making	2	1				1 (Use biostarch)
	Textile	1				1	
	Painting material	2		1			1 (too small scale)
Neijiong	Medicine	3	2	1			
	Food	5	2				3 (small scale)
Anyue	Medicine	2	1			1	
	Food	1	1				
Total		41	15	6	2	13	5

4.3 Questionnaire Design

4.3.1 Consumer Behaviour Questionnaire

Based on the literature review, a consumer behaviour model was built and a series of hypotheses was formulated. Based on the constructed model, we designed a questionnaire in English for the primary data collection before the fieldwork began. It

included four topics in order to answer the proposed research questions. The first part is demographic variables, which includes age, sex, occupation, education, income and household persons. The second part of the questionnaire includes sweetpotato noodle consumption data, which includes the quantity of monthly noodle consumption, the trend of noodle consumption, noodle purchase prices and the required noodle cooking time.

The third part covers the psychographic data, including belief, evaluation and variety seeking measurements. These statements are structured answers and are measured by the Likert Scale, which is a five point rating scale ranging from 'strongly disagree' to 'strongly agree'.

The first step involved in the fieldwork was the translation. A bilingual translator translated the questionnaire into the Chinese version, followed by a discussion with Chinese economists, particularly on the items of variety-seeking measurement. A pre-test, with eight respondents from different income levels, was carried out in Chengdu. The objective was to detect the questionnaire faults and to refine the noodle attributes, specially focusing on whether the respondents misunderstood the questions; the time required to finish the questionnaire; and furthermore, adjusting the noodle attributes. Respondents were asked to judge the listed attributes in the questionnaire, indicating which attributes were the most important for them, and what other important attributes were missing. The information gathered from the pre-test procedure was discussed with food scientists and noodle processing experts before a final draft was constructed. In the end, 15 noodle attributes were chosen for the evaluation of consumers' perception evaluation (both belief and importance). These attributes are price, taste, nutrition, colour, preparation time, elasticity, cooking time, package, shop distance, as vegetable, as main food, as soup, workers' food, poor people's food and market availability. Ten statements from Exploratory Buying Behaviour Tendencies (EBBT) scales were used to measure consumers' variety-seeking tendency. More details about EBBT can be found in Chapter 5.

The last part of the questionnaire was aimed at measuring preference data and was designed for conjoint analysis in Chapter 6. After the pre-test of noodle attributes and discussion with noodle experts, four important attributes (colour, shape, package and price) were used to produce experimental stimuli and 12 product profiles were obtained (more details in Chapter 6). Pictures were taken of these profile products.

The 12 photos were then presented to consumers and they were asked to rank these photos from the least preferred to most preferred.

4.3.2 Household Processing Questionnaire

The procedures for formulating the household processing questionnaire were similar to those used for individual consumers, from pre-test, group discussion to final draft. However, the structure of the questions and their measurement differed.

The questionnaire structure for processing households consisted of four parts: household information, sweetpotato production, processing activities and marketing information. Household information included age and schooling years of the head of household, household size, household labour, composition of household income and geographic location. The sweetpotato production section contained production, yield, planting areas, and utilisation of sweetpotato, such as fresh consumption, pig feeding, marketing and rottenness. The heads of households were asked to fill in the actual numbers for each question. The processing data covered the processing history (starting year), processing season (during which months), processing labour (including number of hired labourers), processing raw material (including quantity of starch purchased), noodle colour and noodle shape. Processing equipment was also listed and processors were asked to tick what they owned. The final part of the household survey dealt with the marketing information. It included noodle production and noodle prices in 1996, how prices were formulated, to whom they sold their noodles, where the traders came from, what the transaction means were, and long term relationships with traders.

4.4 The Execution

4.4.1 Interviewers

The Chinese language is very rich. From the north to the south of China, there are eight basic dialects. Although they share the same writing characters, the speech is so different that people from different areas cannot always understand each other. Therefore, interviewers had to be carefully selected according to the dialect. In the urban survey, our interviewers were mainly local college students. They were easily available and showed strong enthusiasm. Of course, additional training for them was

necessary. The interviewers selected for the rural survey were personnel from the local statistical bureaux. All statistical bureaux in Sichuan Province from provincial to county level have interviewing teams. They are familiar with local environments and have very good knowledge of drawing up samples and interview experience. The refusal rate was relatively low since most Chinese people are outspoken and friendly. However, our experience was that interviewing time had to be chosen carefully. In the urban areas, evenings and weekends were more appropriate, since most of the family are very busy during the daytime and the houses are empty (both wife and husband are working). In the rural areas, it is not a good idea to interview farmers during the agricultural busy season, such as the period of transplanting or harvesting rice. Interviewing farmers is extremely expensive in terms of time spent, particularly in the remote mountainous areas.

4.4.2 Time Schedule

Sweetpotato project fieldwork began in November 1996. The main activities took place from November 1996 to December 1997 and are listed in Table 4.3. These mainly included two formal questionnaire surveys (processing households and individual consumers) and other informal interviews.

Table 4.3 The Schedule of Fieldwork

Month/ year	Pre-test Questionnaire	Rural household Survey	Consumer Survey	Channel Interview	Starch Industry Survey	Data Recording
Nov. 96	♦					
Dec. 96	♦	♦ ♦		♥		
Jan. 97		♦ ♦		♥		
Feb. 97	♣	♦		♥		
Mar. 97	♣					* *
Apr. 97			♣			*
May 97			♣ ♣			
Jun. 97			♣			
Jul. 97			♣		♠ ♠	* *
Aug. 97						* *
Sept. 97					♠	
Oct. 97				♥ ♥	♠	
Nov. 97		♦		♥		
Dec. 97		♦		♥		

*:   Limited attention.   * *: Much attention.

The timetable basically followed the projected schedule. After the pre-test of the designed questionnaire and discussion with local experts, the questionnaire for household processing was first finalised. The survey was conducted in Santai and Anyue counties in December and January 1997, the period when the most intensive processing activities are carried out. Some additional information was collected in November and December 1997 when the second processing season started.

The consumer survey was pre-tested during February and March in 1997. The interviews were first conducted in the provincial capital city of Chengdu, and then continued for rural consumers in Anyue County from April to June. Since a channel interview has to deal with different groups of people in different regions (processors, collectors, wholesalers and retailers), it was convenient to interview them whenever you happened to have access to them. The communication with them took the form of an unstructured open interview with some guideline topics. Therefore whilst conducting rural surveys, some noodle collectors, itinerant wholesalers and retailers were surveyed. The other concentrated channel survey occurred in October and November 1997. The main focus was wholesalers' performance in Chengdu wholesale markets. The starch industry survey was finally carried out in July and September 1996 and ended with fewer respondents than had been expected.

4.5 Secondary Data Collection

Compared with developed countries, secondary data is scarce in China. The State Statistics Bureau used to be the main data collection organisation and served for governmental central planning. The job was hampered or even stopped during the Cultural Revolution (1966-1976). Since the economic reform in 1978, data collection is back on track again at all levels. The State Statistics Bureau started to administer both rural and urban household surveys, which were implemented at each provincial level. The survey items include socio-demographic characteristics, household consumption quantity and expenditure data on various commodities. These data have been published in the State Statistical Yearbook since 1982. In addition to the State Statistics Bureau, each provincial statistical bureau also publishes their statistical yearbooks in detail. In addition to different levels of statistical bureaux, all ministries and ministry-level bureaux also publish their yearbooks, such as the Ministries of

Commerce and of Agriculture. More detailed information about specified sectors can be found in these yearbooks. Our secondary data are mainly from these sources and these data are normally available in university libraries, or research institutions. Some unpublished data were purchased on inquiry at the relevant quasi-government information agencies.

CHAPTER 5

CONSUMERS' NOODLE CONSUMPTION BEHAVIOUR

5.1 Introduction

In order to understand consumer behaviour with regard to sweetpotato noodles, a framework of consumer choice has been developed. In this framework, consumer choice is assumed to be determined by three sets of factors: individual characteristics, product-related characteristics, and environmental characteristics. A series of variables within these three sets is specified as the variables explaining noodle consumption. Some hypotheses concerning noodle consumption are formulated. At the end, sweetpotato noodle consumption behaviour is analysed and relevant hypotheses are tested.

5.2 A Consumer Behaviour Model With Respect to Food Consumption

Since the first consumer behaviour models, such as the EKB model (Engel, Kollat and Blackwell, 1968), were developed in the1960s, marketing researchers have developed a series of models in an attempt to better understand why consumers behave the way they do (see e.g. Schiffman and Kanuk, 1991; Lilien, Kotler and Moorthy, 1992; Engel, Blackwell and Miniard, 1995). Engel, Blackwell and Miniard (1995) developed their new EBM model based on their early work. The EBM model offers a broad framework of consumer behaviour, and includes most of the factors that are assumed to be relevant to consumer behaviour. In this model, they proposed that consumer decision making is influenced and shaped by three groups of factors: (1) individual differences; (2) environmental influences; and (3) psychological processes. They assume that five aspects of individual differences directly affect purchase behaviour: consumer resources; knowledge; attitudes; motivation and involvement; and personality, values and lifestyle. The environmental influences include five categories: culture, social class, personal influences, family and situations. The psychological processes involve complex internal and external information searches. Four steps can be distinguished during the purchase process, i.e. need recognition, search, pre-purchase alternatives and purchase. However, need recognition could

also directly lead to buying action, because the processes of extensive information search and pre-purchase evaluation can be avoided when the purchase does not assume great importance.

Hawkins et al.(1992) distinguished three levels of problem-solving activities to categorise the difficulty of purchase decision making: extended decision making, limited decision making and habitual decision making. In the case of extended decision making, a substantial internal and external information search is required. The decision is made by profound evaluation of alternative choices. Habitual decision making occurs relatively automatically with very little conscious control and it can be broken into two categories: brand loyal decisions or repeat purchase decisions. The degree of complexity of limited decision making lies between extended and habitual decision making. It requires an internal and/or limited external information search. Some evaluation of a few product attributes might occur. The majority of consumers' decision processes fall within the limited decision making category.

Despite the large body of literature on consumers' decision making, very few empirical studies of these models could be found. Economists' studies on food consumption in particular focus on the estimation of income and price elasticities of demand for food. Food consumer researchers taking a behavioural approach often concentrate their research on specific aspects, such as attitude or lifestyle. One reason for the limited number of studies of food consumer behaviour on the basis of the comprehensive models reviewed could be the complexity and diversity of the factors that influence food consumption behaviour. It requires knowledge from a broad array of disciplines, including food science, nutrition, medicine, psychology, sociology, economics, marketing and anthropology (Steenkamp, 1997).

With regard to food consumption in transitional countries, such as in China, consumers had limited choice in the past. However, they have now arrived at the stage of more and better. They are becoming increasingly demanding in particular with respect to basic food products, which have dominated their menu in the past. Gradually, with the rise in disposable income, quality and service have become more important. This puts more pressure on the marketing of traditional foodstuffs, such as noodles, in particular in view the broader choice available in the present markets.

Steenkamp (1997) proposed a conceptual model for consumption behaviour with respect to food as presented in Figure 5.1. In this model, he distinguished three types of factors influencing consumers' decision process: person-related factors, properties

of the food and environmental factors. He also identified a group of variables related to each factor. Person-related factors include biological (age, weight), psychological (personality, lifestyle) and socio-demographic variables (education, household size, employment status, etc.). The properties of the food cover the physiological effects (physical form, energy values, etc.) and sensory perception. The environmental factors include economic (e.g. income, price), cultural and marketing factors (e.g. branding, country of origin, distribution).

Figure 5.1 Conceptual Model for Consumers' Behaviour with Respect to Food
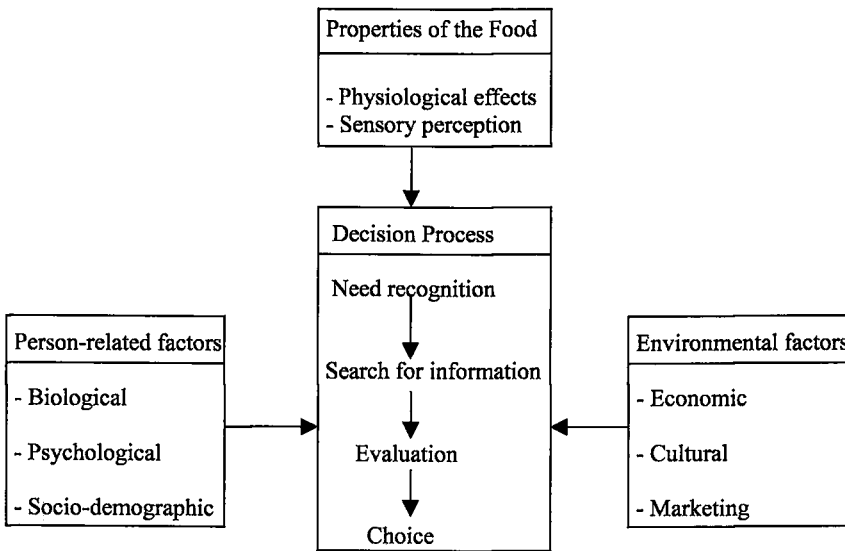
Source : Steenkamp, 1997.

The centre of this model is the four stages of decision-making process: need recognition, search for information, evaluation and choice. The stage-wise approach toward consumers' decision process is widely accepted in the consumer research literature (e.g. Engel, Black and Kollat, 1978; Peter and Olson, 1993; Engel, Black and Miniard, 1993). 'Need recognition' for food is normally evoked when consumers find out their food is out of stock, or via market stimulation, such as by advertisements. Need recognition can also be stimulated by dissatisfaction with current products, for instance because of poor quality of the product, or packaging. The most important information search for food choice is the internal search for information based on consumers' previous experience. The external search for

information is fairly limited for daily food products and is not considered. Consumers evaluate food on an array of criteria, which they value, such as prices, taste, etc. Evaluation is a kind of mental trial and consumers combine their knowledge to judge the alternatives. After a choice is made, a product is purchased. Outcome of the choice may be satisfaction or dissatisfaction. Consequently the choice result will influence the next information search and choice.

5.3 Analytical Framework for Sweetpotato Noodle Consumption

Following Steenkamp's categorisation scheme in his conceptual model, we distinguish three categories of factors, which influence consumers' noodle choice behaviour: Individual Characteristics, Product-related Characteristics, and Environmental Characteristics. They might serve as a frame of reference for our analysis of noodle consumption. The complete structure is presented in Figure 5.2.

Figure 5.2 Analytical Framework for Sweetpotato Noodle Consumption
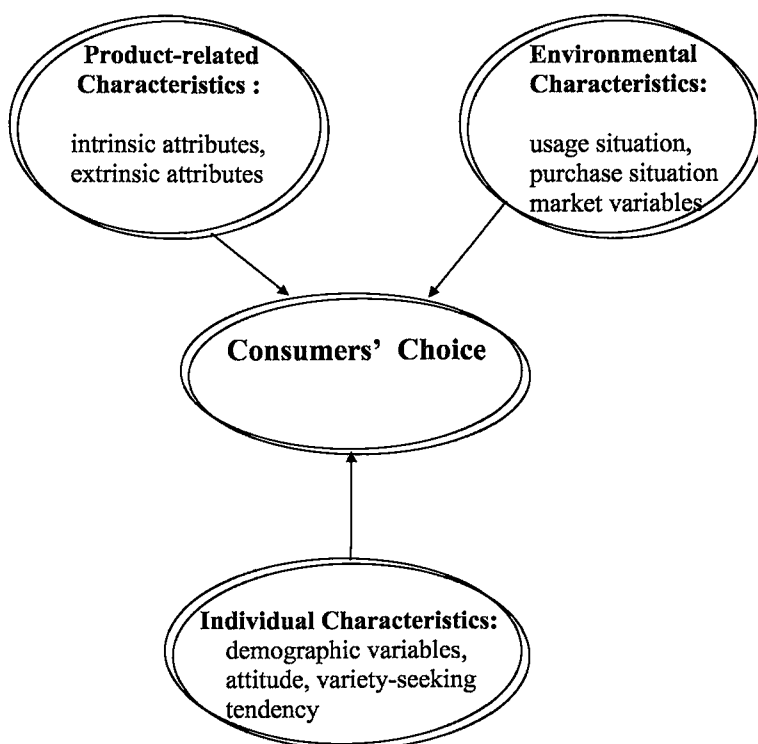
We skip portions of the complex decision processes in Steenkamp's conceptual model, such as need recognition, search and evaluation. We focus on consumers' 'Choice' in the framework. A number of variables are specified in the three sets of characteristics, which are supposed to influence consumer choice with respect to noodles. Individual characteristics are 'attitude' and 'variety-seeking tendency' besides the demographic variables. Cultural influences are skipped since our research is concentrated in a region where consumers share a relatively homogeneous culture. We include 'income' as an individual characteristic and 'price' as a product-related characteristic. Situational effects are included as environmental characteristics in addition to market variables. Product-related characteristics are differentiated in intrinsic attributes and extrinsic attributes.

In the following sections, we will elaborate our discussion of the three sets of characteristics influencing consumers' choice with respect to noodle consumption.

5.3.1 Individual Characteristics

Individuals can differ in many ways, such as demographics, attitude, variety-seeking tendency, involvement, etc. The demographic variables included in our research cover age, sex, professions, education, income, dwelling allocation, and household size. These variables are directly measurable while measurement of other variables, such as variety seeking and involvement, are more complex concepts and require special measurements. Our discussion will focus in particular on attitude and variety-seeking tendency given their importance in the food consumption domain.

Attitude

Attitude is a significant individual characteristic that could influence consumers' choice behaviour. Conceptually, 'attitude' consists of three components: a cognitive (beliefs), an affective (feelings) and a conative (behavioural intentions) component. People's overall evaluations of an attitude object differ and are determined by their beliefs and/or feelings about the object. However, an overall evaluation cannot tell why consumers feel the way they do. Multi-attribute attitude models answer this question. A multi-attribute model views an attitude object (brand, store, product. etc.) as possessing many attributes (characteristics) that provide the basis upon which consumers' attitudes will depend (Wilkie, 1994). Multi-attribute attitude models are

probably the most widely used models in consumer behaviour research. The Fishbein Model (Fishbein and Ajzen, 1975) is the representative one. In this model, the overall attitude toward an object is the summed products of the belief that the object possesses attribute i and the evaluation of attribute i. The Belief/Importance Model is another approach to measuring attitude (e.g. Wilkie, 1986). The basic formula for this multi-attribute attitude model is

$$A_j = \sum_{i=1}^{n} B_{ij} I_i$$

where
A_j = the consumer's attitude score for object j.
I_i = the importance weight given to attribute i by this consumer.
B_{ij} = the consumer's belief as to the extent to which a satisfactory level of attribute i is offered by object j.

A great deal of research has been carried out to study the relationship between attitude and behaviour (e.g. Jaccard and Wood, 1986; Sheppard, Hartwick and Warshaw, 1988). Some studies support the attitude-behaviour relationship, but many results suggest that consumers' attitudes might not be so strongly related to actual behaviour, in particular, when behaviour is susceptible to social influences. Fishbein's well-known behavioural intention model represents this approach (Engel, Blackwell and Miniard, 1993; Peter and Olson, 1993). This so-called 'Theory of Reasoned Action' model views that a person's behaviour as a function of his or her intention to carry out the behaviour, and two factors are seen to influence the behaviour intention: 1) The person's attitude toward the behaviour, 2) The person's subjective norms. The subjective norms refer to the person's perception of how others, who are important to him, will react to his behaviour. The model postulates that it is the intention, not the attitude, that is the best predictor of consumers' behaviour. This model has received broad support in empirical studies (Ajzen and Fishbein, 1980; Miniard and Cohen, 1981; Oliver and Bearden, 1985; Taylor and Todd, 1994).

Attitude might become of increasing importance with respect to food consumption in a transitional economy. Compared with the past, there is more product diversity in the markets and consumers become better informed. The growing consumers' knowledge can expand their cognitive component and increase the strength of attitude in explaining their behaviour. Furthermore, rising income and liberalised markets can enhance the realisation of the conative component of consumers' attitude toward objects.

Variety-Seeking Tendency

Consumer researchers tend to assume that consumers' behaviour is 'governed by laws, which can be discovered and researched' (Grunert, 1988). However, it has been noticed that not all consumer behaviour can be explained by this approach. Consumers have also exploratory behaviour, such as curiosity-motivated behaviour, variety seeking, and risk taking (Raju, 1980). All these behaviours lead to exciting and novel purchase experiences. Exploratory buying behaviour tendencies are especially strong in the area of food (Hoyer and Ridgway 1984).

Variety-seeking behaviour with respect to food consumption has received considerable attention (van Trijp and Steenkamp, 1992). Variety-seeking behaviour is most often seen when there are many alternatives, and the perceived risk in switching to others is low. Van Trijp (1995) distinguished true variety-seeking behaviour from derived variety behaviour. True variety seeking is behaviour as a result of boredom, curiosity or attribute satiation, while derived variety behaviour 'denotes extrinsically motivated variation in behaviour'. For example, if a consumer switches to a new product because the usual brand is out of stock, this is a 'situational derived variety behaviour'. Since the consumption of noodles can easily be boring, this can be a motivation for variety-seeking behaviour.

The central concept used to explain the variety seeking is variety seeking tendency. It is conceptualised as a derivative of a more general individual trait: Optimum Stimulation Level (OSL, Van Trijp, 1995). It is assumed that individuals differ in their optimal arousal or stimulation. When environmental stimulation (e.g. novelty, complexity, etc.) is below the optimum, a consumer will attempt to increase stimulation; when it is above the optimum, he will strive to reduce it (Raju, 1980). The role of OSL in exploratory behaviour has been studied extensively by psychologists. The general finding has been that people with higher OSL engage in exploratory behaviour to a greater extent than people with lower OSL.

Different scales have been developed to measure consumers' variety-seeking tendency. Van Trijp and Steenkamp (1992) developed an eight-item scale called VARSEEK for measuring consumers' variety seeking tendency with respect to foods. Van Trijp (1995) also shows that VARSEEK is significantly correlated with the general personality measures for OSL, like the Change Seeker Index (CSI), and the Sensation Seeking Scale (SSS). The test results strongly support the conclusion that VARSEEK outperforms general personality measures for OSL.

The Exploratory Buying Behaviour Tendencies (EBBT) is another scale developed by Baumgartner and Steenkamp (1996) to measure individual differences in consumers' tendencies to engage in exploratory buying behaviour. This measurement scale consists of 20 items, which are distinguished as dimensions of Exploratory Acquisition of Products (EAP, 10 items) and dimensions of Exploratory Information Seeking (EIS, 10 items). In their four experiments, it is found that EAP and EIS exhibit different relations with consumers' actual behaviour. In other variety-seeking behaviour studies on beer, coffee, hand-rolled tobacco and cigarettes, Van Trijp et al. (1996) also found that EAP have significant effects on consumers' true variety-seeking behaviour. Because of the intercultural aspect of the EBBT scale (tested in different countries), we will apply the EAP items to measure the Chinese consumers variety seeking tendency by skipping the EIS items, since some information seeking used in EIS items (e.g. mail advertising) are not popular in China's markets.

Variety seeking is relevant for food marketing in a transitional economy. During the central planning period, consumers were confronted with a limited product assortment and had little income for spending. However, more modified and completely new products now offer consumers wider choice. The demand for traditional basic foods such as rice and noodles, is becoming satiated. With more disposable income, consumers are seeking new varieties. Therefore, there is increasing interest in variety seeking with respect to the food domain.

Involvement

Involvement is another individual-related characteristic seeming relevant to food consumption. It can be defined as 'a motivational state of mind of a person with regard to an object or activity. It reveals itself as the level of interest in that object or activity' (Mittal and Lee, 1989). It is generally assumed that there is a strong relationship between consumers' involvement and the type of decision making (Hawkin, 1992, Engel, et. al., 1993). As consumers move from a low level of involvement to a high level of involvement, decision making becomes increasingly complex. High levels of involvement are normally associated with extended decision making, whereas low involvement leads to the more simplified choice of limited problem solving.

Involvement theory is still immature, which can be seen from the great variation in conceptualisation and measurement of involvement (Schiffman and Kanum, 1991).

Different types of involvement are distinguished, e.g. high involvement vs. low involvement, product-class involvement vs. brand-choice involvement, cognitive involvement vs. affective involvement (Mittal and Lee, 1988, Wilkie, 1994). Related to the differences in definitions, different scales of involvement measurement have been developed (e.g. Zaichokowsky, 1985; Mittal and Lee, 1989). It is emphasised that 'involvement should be measured on a continuum rather than as a dichotomy consisting of two mutually exclusive categories of 'high' and 'low' involvement' (Schiffman and Kanum, 1991).

Although the study of involvement has caught a lot of attention in consumer research, we are not going to take it into consideration in our framework, since involvement is more relevant to extensive problem solving. Our research on sweetpotato noodles consumption is categorised as limited decision making. Both noodle production and consumption procedures are fairly standardised, which corresponds to a low level of consumer involvement. Systematic low involvement in noodle consumption will contribute little to explaining consumers' choice behaviour.

5.3.2 Product-related Characteristics

Every food product has its own intrinsic attributes (taste, colour, smell, ...). Consumers perceive these intrinsic attributes when they consume products. These attributes form consumers' sensory perceptions (Steenkamp 1996). With regard to noodles, except for the attributes such as taste and colour, consumers also perceive the differences between noodles in terms of thickness, surface smoothness, elasticity and so on (Lin, 1994). More extrinsic product-related characteristics would also affect consumers' choices. Price is considered as a traditionally important factor when consumers make their choice. However, there is considerable variation in the price importance across both consumers and products. Consumers' sensitivity for prices depends on the category to which the product belongs (normal, luxury or Giffen case). Recent studies in seven EU countries found that the five most important criteria in the consumers' food choice process are product quality, price, brand name/reputation, freshness and guarantee when consumers make a choice of a product (Steenkamp, 1997).

All specified variables describing intrinsic and extrinsic attributes are derived from consumers' own perception during the pre-test as already presented in Chapter 4. The intrinsic attributes of sweetpotato noodles used in the analysis include taste, colour,

elasticity and nutrition. These are basic elements of noodle products, which indicates that consumers have a strong concern about their nutrition and sensory perception. Extrinsic attributes cover price, packaging, image, preparing time and cooking time. The extrinsic attributes are becoming increasingly important as consumers become more quality conscious.

5.3.3 Environmental Characteristics

Except for the product-related characteristics and consumer characteristics, environmental characteristics will also have effects on consumer choice. Basically, three factors are distinguished for environments in Steenkamp's model: cultural, economic and marketing environments.

Generally speaking, cultural environments include all social interactions amongst people in a society. Although social environmental factors, such as culture, sub-cultural and social classes, could influence consumer behaviour, we will not take them into account. Since our research focuses on consumers in one province of China, their culture is relatively homogeneous, and the social stratification is not so important and is unclear after four decades of equalisation under the socialist regime. Neither will we focus our research on economic factors characterising the national economy such as growth rate of GDP. Our analysis is a cross-sectional study and consequently all respondents experience the same general economic situation. In addition, the effect of the economic boom on basic food consumption is limited. However, we still keep 'income' and 'price' as important economic variables in our framework since they might differ a great deal between individual households.

Marketing researchers often analyse the influence of market environment in the context of a specific 'situation'. Normally, three types of situation are defined: usage situation, purchase situation and communication situation. (Engel, et al.1985; Hawkins, et al. 1992). Usage situation refers to where, when and why to consume the products. Normally, consumers have various usage situations regarding sweetpotato noodle consumption. Sweetpotato noodles can be used as soup, vegetables and main food. Purchase situation normally means the in-store environment, for example, product availability, change in price. Given the large number of seasonal sweetpotato processors, it is also important to investigate noodle availability in the markets. Communication situation is how consumers obtain the commercial information (from

radio, TV, or magazine). Since noodles are generic products and no commercial promotion is available yet in China, we omit the communication situation from our analysis and concern ourselves only with usage and purchase situations. Another important market environment refers to how consumers have access to products, such as market outlet and market distance.

In summary, the specified environmental variables include noodle usage as vegetable, as main food and as soup, product availability, market outlets and market distance.

5.4 Hypothesis Formulation

A series of hypotheses on noodle consumption are formulated in relation to the three sets of explanatory variables in the proposed framework.

Hypotheses for Product related variables:

Economists have extensively studied consumers' demand in relation to prices and income (Deaton and Muellbauer, 1980). According to classical economic theory, normal products have negative price elasticity while only a few exceptions show a positive price elasticity, the so-called 'Giffen' goods. Sweetpotato noodles belong to normal foodstuff of Chinese consumers. Consumers are assumed to be price conscious and a low price is much preferred. Therefore, we formulate:

H1: There is a negative relationship between noodle price and noodle consumption.

There is a growing importance attached to packaging in developing countries given consumers' rising standards of health and sanitation. The rapid growth of supermarkets in China also has a strong influence on consumers' packaging conceptions. Packaging involves activities from designing to producing containers or wrappers for products. Packaging has two properties: physical and image. The physical property brings product convenience, cleanliness and prevents evaporation, spilling and spoilage. Image property of a package refers to the package design and its related labelling and branding. Packaging could also be a unique way for companies to distinguish themselves from others and help to implement their marketing programme. Therefore, compared with unpackaged noodles, packaged noodles are sanitary and attractive and consumers tend to purchase packaged noodles.

H2: There is a positive relationship between noodle packaging and noodle consumption.

Hypotheses for Environmentally Related Variables:

Product availability in the markets directly affects consumers' purchase situation. Two elements influence product availability in the markets: sufficient supply and presence of effective retail outlets. Seasonal supply and lack of stock will directly affect noodle availability in the market. The types of retail outlets are increasing, such as speciality stores, home shopping, discount houses, supermarkets and grocery stores. Product availability depends on the number of retail outlets and on the distribution strategy of retailers. An insufficient distribution system will affect consumers' noodle consumption. We assume that a good physical market structure, including transportation and communication, could also stimulate noodle consumption. We then have the following hypotheses:

H3: There is a positive relationship between noodle availability in the market and noodle consumption.

H4: The shorter distance consumers have to travel to market outlets carrying noodles, the more noodles are consumed.

Hypotheses for Individually Related Variables:

As already discussed in last section, it is argued that behaviours are affected both by attitudes and 'subjective norms'. We argue that noodle products belong to the category of normal foodstuffs, therefore consumption of noodles largely takes place at home and for that reason subjective norms are not significant for noodle consumption. We propose therefore that only attitude is positively related to consumers' noodle consumption and exclude 'subjective norms':

H5: There is a positive relationship between consumers' attitude toward noodles and consumers' noodle consumption.

Since sweetpotato noodles are a normal basic food, it is difficult to formulate the hypotheses for demographic variables, such as the relationship of age, sex and income to noodle consumption. The elderly may eat less than the younger and women may eat less than men, but they are not strong enough to formulate any hypotheses. However, we retain these demographic variables in our study to analyse possible differences in noodle consumption between demographic groups.

Given the satiated noodle market, hypotheses on the relationship between variety seeking tendency and consumers' consumption are also difficult to formulate. We will keep the variety-seeking tendency in our analysis to see what the test results are. In addition, we feel that variety seeking is becoming important with respect to Chinese food consumption and therefore we would like to further explore the relationship between variety-seeking tendency and consumers' demographic variables.

Van Trijp (1995) studied the variety seeking tendency for both Dutch and Finnish consumers. He concluded that the characteristics of the high variety seeking tendency consumers show a similar pattern across culture. Variety seeking tendency with respect to food is higher among females than males. High variety seeking consumers belong to a higher social class with a higher income and a higher education. We therefore propose the following five hypotheses for Chinese consumers based on Van Trijp's findings.

The first hypothesis is about the gender difference. Women basically love and tend to shop more often than men do. They face more choice opportunities and thus could show a higher variety-seeking tendency. We then have *H6: Women show a higher variety seeking tendency than men do*. Urban consumers shop more often and also face more choices in the markets than rural consumers. Rural consumers tend to consume more of their own products. Therefore, we hypothesise that *urban consumers have a higher variety-seeking tendency than rural consumers (H7)*. Younger consumers are often confronted with different cultures and are considered more often to be risk seekers. Their purchase behaviours tend to seek novelty and curiosity. Therefore, *younger consumers could show higher variety-seeking behaviour (H8)*. More highly educated people often enjoy higher income. Their higher incomes make them more able to seek wider varieties in their choices (H9 and H10). Therefore, several hypotheses regarding consumers' socio-demographics are summarised as:

H6: Women show a higher variety-seeking tendency than men.

H7: Urban consumers have a higher variety-seeking tendency than rural consumers.

H8: Variety-seeking behaviour is more likely to occur for younger consumers.

H9: More highly educated consumers have a higher variety-seeking tendency.

H10: Consumers with a higher income have a higher variety-seeking tendency.

5.5 Analysis

5.5.1 Introduction

This section will analyse consumers' choice behaviour with regard to sweetpotato noodle consumption by using the framework developed in Section 5.3 and 5.4. Three different analyses are carried out to test our hypotheses. Firstly, we analyse noodle consumption as a function of consumers' attitudes versus sweetpotato noodles and of some demographic variables. In the analysis, a multi-attribute model is chosen to measure consumers' attitudes. This model is used to test the relationship between attitude and behaviour as formulated in hypothesis 5. This test is performed by regressing noodle consumption on attitude and a number of demographic variables. Attitude is a complete concept for explaining consumers' behaviour but less operational, therefore additional analysis is made in order to obtain more functional results. Factor analysis is then carried out on a number of perceptual attributes to a number of underlying perceptual dimensions. In the second analysis, consumers' noodle consumption is regressed on the derived factor scores. In the third analysis, noodle consumption is analysed as a function of variables, which are characteristic of the extracted factors (shown by high loadings), and a number of demographic variables. Finally some additional hypotheses regarding variety-seeking behaviour are also tested.

Variable Definitions

All variables used in the analysis can be basically grouped into three categories as distinguished in the model framework. Table 5.1 displays the variable labels, variable names and their measurement levels.

The demographic variables include age, sex, education, income, household size and consumers' geographic region. The 10 items of EBBT sub-scale EAP is employed for measuring consumers' variety-seeking tendency. All product attributes in table 5.1 are generated from the literature review, a pilot test and consultation with experts such as noodle processors, lab researchers, etc. Details can be found in the questionnaire design as described in Chapter 4. These attributes include taste, colour, elasticity, nutrition, price, packaging, preparing time and cooking time. Also the perception of 'workers' food' and 'poor people's food' are included.

Two situational effects are included in the environmental variables, the usage and purchase situations. The usage situation of sweetpotato noodles covers the uses as vegetables, as main food and as soup. The purchase situation includes noodle availability in the market. A third environmental variable is a market variable, which consists of consumers' perception of their distance to the noodle markets. The amount of monthly noodle consumption represents consumers' actual choice outcome and is used as a dependent variable in the analysis.

We will apply the compositional approach by studying the impact of consumers' attitude on noodle consumption. The Belief/Importance model is used to measure the attitude. The attitude scores (Attiscor) are calculated as the weighted sum of all 15 attribute evaluations, multiplied by the importance of the attribute (see 5.2.2).

5.5.2 Multiple Regression Analysis of Noodle Consumption on Attitude and Demographic Variables

Multiple regression analysis is carried out to predict consumers' sweetpotato noodle consumption based on their attitude scores ('ATTISCOR'), individual demographics and variety seeking tendency scores ('EBBTOTAL'). The quantity of consumers' monthly noodle consumption 'monthsp' is chosen as the dependent variable. The regression results are presented in Table 5.2.

Table 5.1 Variables Used in the Empirical Test

Variable Label	Empirical Name	Measurement Level
Individual Consumer Variables		
Age, sex, education, income, household persons, Region (0: urban, 1: rural)		Either nominal or numerical level.
Variety-seeking tendency	ebbt1 to ebbt10	Five point scales (numerical)
Product-related Variables (include both beliefs and importance measures)		
Noodle taste	tastesp,	Five point scales
Noodle colour	colorsp,	Five point scales
Noodle elasticity	elastsp,	Five point scales
Noodle nutrition	nutrisp,	Five point scales
Price	cheapsp	Five point scales
Package	packagsp	Five point scales
Preparation time	prepasp	Five point scales
Cook time	cooksp	Five point scales
Others	Laborsp, poorsp	Five point scales
Environmental Variables (include both beliefs and importance measures)		
Served as vegetable	vegetsp	Five point scales
Served as main food	mainfdsp	Five point scales
Served as soup	soupsp	Five point scales
Availability in the markets	availasp	Five point scales
Market distance	distansp,	Five point scales
Consumers' Choice		
Amount of monthly consumption	monthesp	Numerical level

Table 5.2 Model Estimation Results on Attitudes and Demographic Variables (N=210)

	Standardized Coefficients (Beta)	t	Sig.
ATTISCOR	0.181	2.505	0.013
AGE	-0.072	-1.033	0.303
REGION	-0.012	-0.155	0.877
PERSONS	0.076	0.976	0.330
INCOMEE	-0.091	-1.176	0.241
EBBTOTAL	0.074	0.998	0.320

Multiple R   0.235
R Square   0.055
Standard Error   3.836
$F (6, 203) = 1.977$, $P = 0.07$

The value of R^2 indicates the percentage of total variation of 'monthsp' explained by the predictor variables. R^2 is small, 0.055, and the analysis of variance table shows that it is statistically significant at 7% level only.

Furthermore, none of the regression variables are statistically significant except for the attitude scores. The regression coefficient of attitude scores 'ATTISCOR' is significant at 2% level. So there is a positive relationship between attitudes and consumers' noodle consumption and therefore Hypotheses 5 is supported.

As the test results shown, demographic variables do not cause differences in noodle consumption. This conclusion suggests that noodles are a foodstuff consumed daily irrespective of differences in income and age. It is tempting to find out whether we can better understand noodle consumption by using the specific beliefs, which make up the attitude as explanatory variables. This is the purpose in the next section.

5.5.3 Multiple Regression Analysis on Perceptual Attributes and Demographic Variables

5.5.3.1 Determining the Relevant Perceptual Variables for Regression Analysis

On the basis of exploratory research and contacts with experts, 15 attributes were determined, which seem relevant explanatory variables of noodle consumption. The information contained in these 15 variables is summarised into a smaller set of new variables with a minimum loss of information by factor analysis. Product-related characteristics and environmental characteristics are examined to identify the

underlying factor dimensions. The reduced number of variables will be used as input for subsequent regression analysis.

Stage one: Data evaluation for the appropriate use of factor analysis

In general, the required sample size for factor analysis is at least five times the number of variables. The more acceptable range would be a ten-to-one ratio. In our study the 14-to-1 ratio (210/15) falls within the acceptable range. The result shows that the Bartlett's test of sphericity value is 1140.77, and the p-value is significant at .001% level. Therefore, the 15 variables are correlated to certain degree, so factor analysis can be applied.

Kaiser-Meyer-Olkin (KMO) is another index of measuring the sampling adequacy by comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The 0.837 KMO value of the result falls in the range of meritorious. All above tests indicate that the set of variables is appropriate for factor analysis.

Stage Two: Factor Extraction

A number of methods can be chosen to extract factors. Principal Components Analysis (PCA) in which linear combinations of the variables are formed was selected for this study. PCA tries to explain the total variance as well as possible by a minimum number of factors. The first principal component accounts for the largest amount of variance, and successive components explain consecutive smaller portions of the total sample variance. Several criteria can be used to determine the number of factors. The most widely applied one is the Eigenvalue criterion. The eigenvalue is the variance explained by a factor. Only the factors having eigenvalues larger than 1 are selected. However, this method is most reliable when the number of variables is between 20 and 50 (Hair et al., 1995). Researchers can also set a fixed number of factors when they already know how many factors to extract or how to test a hypothesis. Another criterion is that the number of factors should explain at least 60% of the variance.

Table 5.3 The Results of Factor Extraction of 15 Product Attributes

Factor	Eigenvalue	Percent of Variance	Cumulative Percent of Variance
1	4.90486	32.7	32.7
2	1.70520	11.4	44.1
3	1.12818	7.5	51.6
4	.98092	6.5	58.1
5	.93226	6.2	64.3
⋮	⋮	⋮	⋮
14	.35614	2.4	98.1
15	.28096	1.9	100.0

The results of PCA are presented in Table 5.3. If we apply the Eigenvalue criterion, three factors should be derived since their values are larger than 1. However, three factors only represent 51.6% of the variance of the 15 variables. If one more factor is added, the explained variance is close to the required 60% and reaches 58.1%. Therefore, four factors are retained for interpretation.

Stage Three: Interpreting the Factors

PCA extracted four factors. The factor matrix obtained indicates the relationship between factors and individual variables. The factor loadings represent the unique contribution of factor to the variable, and are equal to the correlation between factors and variables. Normally the factor matrix is difficult to interpret since most of factors are correlated with many variables. In order to identify meaningful factors, an Orthogonal rotation (Varimax) method, which makes each variable loading high on one factor only, was applied.

Table 5.4 shows the rotated factor matrix with the loading sorted by size for each factor. As can be seen, six variables load highly on factor 1, four variables on factor 2, three on factor 3 and two on factor 4. According to the guidelines for identifying significant factor loadings based on sample size, the cut-off point in our case should be 0.35 (Hair et al., 1995, p.385). Therefore, all grouped loadings are significant to explain their respective factors since their values are all above 0.35 with the range between 0.46974 and 0.78563.

Table 5.4 Rotated Factor Matrix of 15 Product Attributes

Varimax -Rotated Loading

	Factor 1	Factor 2	Factor 3	Factor 4
Given names:	convenience	market situation	sensory quality	image
PACKAGSP	.77332	.04850	.11271	.16179
SOUPSP	.70281	.24651	.00899	.15155
COLORSP	.69536	.02431	.18024	-.28604
PREPASP	.61208	.23976	.28004	.10305
COOKSP	.57084	.15002	.26086	.10625
MAINFDSP	.48856	.37129	.18990	.28359
AVAILASP	-.04744	.78399	.32306	-.07062
DISTANSP	.38905	.66744	.06894	-.13919
VEGETSP	.12005	.66508	.17043	.16053
CHEAPSP	.27429	.46974	.06614	-.11628
ELASTSP	.14772	.12989	.72206	.18801
NUTRISP	.28192	.10953	.71173	-.09051
TASTESP	.12989	.30764	.70075	-.11037
POORSP	.00159	-.27065	-.13427	.78563
LABORSP	.38632	.26127	.22411	.70474

The six variables loading on factor 1 are packaging, soup, colour, preparation, cooking time and use as main food. These variables can be mainly characterised as the convenient usage of sweetpotato noodles, particularly for the first two loading variables 'package' and 'soup' as well as noodle preparation and cooking times. We therefore label factor 1 as 'convenience'. Variables of noodle availability in the markets, market distance, vegetable usage, and price significantly load on factor 2. We can name factor 2 as 'Market Situation' since the first two loadings refer to market variables. The three variables of elasticity, nutrition and taste on factor 3 characterise noodles' intrinsic attributes, so the name of 'Sensory quality' could be suitable. The last factors consisted of two loadings from variables of poor peoples' food and working people's food. Obviously, 'Image' is a good name for this factor. What noticed is that three consumption situations do not load on one factor, while consumption as soup and main food load on factor 1 and consumption as vegetable on factor 2. The reason could be that consumers might have different perception regarding to the consumption situations of noodles as soup, vegetable and main dishes.

If we further check the individual variables, packaging and availability have the highest loading on the first two factors, which indicates the importance of these two variables.

5.5.3.2 Results

Four sets of factor scores (factor 1: convenience, factor 2: market situation, factor 3: sensory quality, and factor 4: image) generated from factor analysis replace the original 15 variables as a new data set in the subsequent analysis. Noodle consumption is then regressed on these four factors and the results are presented in Table 5.5. The results show that R^2 is 0.074 and significant at 5% level. The t values also show that factor 1 is significant at 1% level, factor 2 is significant at 10% level, while 'score 3' and 'score4' are not significant. This indicates that 'convenience' and 'market situation' are two important factors in explaining consumers' noodle consumption.

Table 5.5 Estimation Results on Factor Scores

Dependent Variable
Monthsp: monthly consumption of noodles

	Standardized Coefficients	t	Sig.
FACTOR1	0.205	2.840	0.005
FACTOR2	0.117	1.697	0.091
FACTOR3	0.055	0.790	0.430
FACTOR4	0.077	1.125	0.262
AGE	-0.072	-1.039	0.300
PERSON	0.067	0.976	0.405
REGION	0.067	0.481	0.631
INCOME	-0.019	-0.233	0.816

Multiple R: 0.271
R Square: 0.074
Standard Error: 3.836
$F (6, 203) = 2.008$ $P = 0.047$

Using individual scores on factors 1, 2, 3, and 4 as explanatory variables in our regression analysis minimises the information loss with respect to the explanatory perceptual variables. However, these factors are less operational from the point of view of policy purposes. Therefore, also individual variables instead of factor scores

are used to give more insight in finding out which variables matter most in consumers' choices. On the basis of the factor loadings, the first two variables on the first three factors are selected for subsequent use. As a result, the new data set of explanatory variables includes packaging, soup, availability, market distance, noodle elasticity and nutrition. Noticeably, the price variable 'CHEAPSP' is not included in this new data set due to its low loading on Factor 2.

A third multiple regression analysis was carried out in which the quantity of consumers' monthly consumption was regressed on the six variables selected on the basis of factor analysis, demographic variables and variety-seeking tendency score.

The estimation results in Table 5.6 include the estimated regression coefficients, standardised Beta coefficients, collinearity statistics and model fit. When several cognitive variables are used as predictors in multiple regression, a key issue is to check the collinearity, that is the correlation among these predictor variables. Two common measures for diagnosing multi-collinearity are the Tolerance value and its inverse, the Variance Inflation Factors (VIF). It is generally believed that, if the tolerance value is below 0.10, then there is high collinearity (Hair et al., 1995). In Table 5.6, all tolerance values are considerably higher than .10. Therefore, the regression results are not seriously affected by multi-collinearity. The results show the R^2 value is low, 0.151, but significant at 0.001% level.

The results show that packaging is significant at 0.1% level. Market distance, noodle elasticity, and noodle nutrition' are significant at 5% level while product availability is significant at 10% level. Therefore, hypotheses H2 and H4 regarding 'packaging' and 'market distance' are supported. Hypothesis 3 about the product availability is weakly supported. Again, all demographic variables and EBBT scores are not significant in explaining consumers' noodle consumption. Once again, the results show that packaging plays a very important role in consumers' noodle consumption. Market variables, such as product availability and market distance cannot be neglected either. Improvement in the market environment can directly stimulate noodle consumption. In addition, consumers do care a lot about the noodle quality, particularly the intrinsic attributes of elasticity and nutrition.

Table 5.6 Multiple Regression on Specified Variables

	Standardized coefficients (Beta)	t	Sig.	Collinearity Statistics (Tolerance)
PACKAGSP	0.260	3.359	0.001	0.704
SOUPSP	-0.006	-0.077	0.939	0.674
AVAILASP	0.220	1.936	0.054	0.328
DISTANSP	0.182	2.467	0.014	0.775
ELASTSP	0.225	2.007	0.046	0.335
NUTRISP	0.205	2.151	0.033	0.467
AGE	-0.109	-1.617	0.107	0.924
PERSONS	0.072	0.951	0.343	0.735
REGION	0.134	0.981	0.328	0.227
INCOMEE	0.000	-0.971	0.333	0.721
EBBTOTAL	0.070	1.046	0.297	0.867

Multiple R	0.388
R Square	0.151
Standard Error	3.6791

F (11, 201) = 3.244   P = 0.000

5.5.4 Additional Tests for Variety-seeking Tendency

Although the results show that EBBT scores are not significant in explaining consumers' noodle consumption, it seems useful to perform some further tests in order to better understand the relationship between variety seeking and consumers' characteristics for the future development of noodle products.

The overall distribution of EBBT scores is presented in Figure 5.3. Since the 10 items are rated on five point scales, the theoretical EBBT scores range from 10 to 50. However, the actual minimum and maximum scores are 17 and 40 respectively, with a mean of 27.52.

Figure 5.3 The Distribution of EBBT Scores

Histogram

Std. Dev = 3,97
Mean = 27,5
N = 261,00

EBBTOTAL
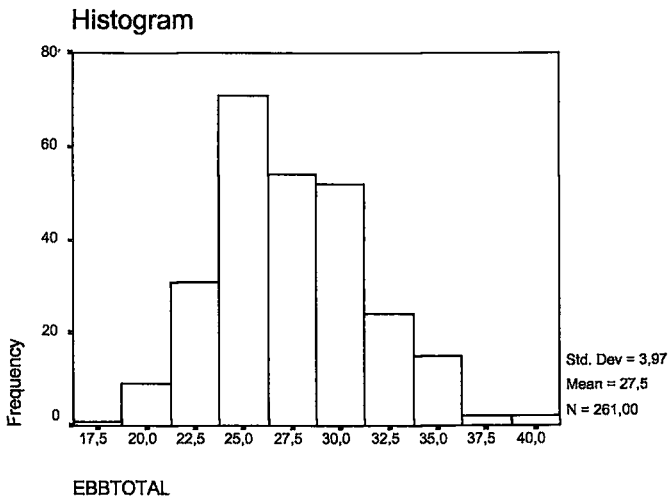
One-way ANOVA analyses are carried out to test the variety seeking hypotheses formulated in the last section. Table 5.7 shows the results of variety seeking tendency in relation to consumers' demographic variables. No difference is found for sex. Therefore, Hypotheses 6 is rejected. Hypotheses 7, 8, 9 and 10 are supported to different degree since it is found that, variety seeking tendencies are higher among urban consumers than among rural consumers (5% level), and among younger consumers than among older consumers (10% level). Both higher educated consumers and higher income consumers have higher variety seeking tendencies than the lowers ones (1% level).

Our results are basically in line with Van Trijp's (1995) assertion that the socio-demographic characterisation of the high variety seeking tendency consumers generalised across cultures. One contribution of this study is the finding that the urban consumers have a higher variety-seeking tendency than that of rural consumers. It implies that consumers could be segmented between urban and rural regions in China.

Table 5.7 The Relationship between EBBT Scores and Consumers' Demographic Variables

Demographic Variables	N	EBBT score	F-value	Sign.	Hypotheses
Sex					
Male	109	27.20	1.021	0.313	H6
Female	150	27.71			
Region					
Urban	104	28.115	3.925	0.049	H7
Rural	157	27.127			
Age					
20-30	68	28.5	3.006	0.051	H8
31-45	133	27.06			
above 45	60	27.41			
Education					
Lower	66	26.65	5.314	0.005	H9
Middle	112	27.21			
Higher	83	28.63			
Income (yuan)					
< 1,000	132	26.75	6.288	0.002	H10
1,001-1,500	88	28.15			
above 1,500	39	28.92			

5.5.5 Conclusion and Discussion

A consumer behaviour model with respect to sweetpotato noodle consumption is proposed, based on a review of previous literature. It is assumed that three factors influence consumers' food consumption. These are individual characteristics, product related characteristics and environmental characteristics. Variables for each category are also specified and a series of hypotheses related to noodle consumption are formulated.

Three model specifications are applied to analyse consumers' sweetpotato noodle consumption within the proposed framework, one using attitude and the other two by (factors derived from) perceptual variables as explanatory variables in addition to demographic variables and variety seeking tendency. The results from the attitude approach show that attitude is a significant variable in the explanation of noodle consumption. Therefore, Hypotheses 5, which argues that a positive relationship exists between attitude and consumers' noodle consumption, is supported.

In the second model analysis, factor analysis is carried out first. Four factors are derived and they are labelled as 'convenience', 'market situation', 'sensory quality' and 'image'. Factor scores replace attitude scores and are used as predictive variables in the multiple regression. The results show that factor 1 ('convenience') and factor 2 ('market situation') are significant in explaining consumers' noodle consumption. In the third model, a number of specific attributes are related to the noodle consumption. The analysis results indicate that 'package' has a positive influence on consumer's noodle consumption. Consumers have a strong demand for packaged noodles. Contrary to consumers' needs, most sweetpotato noodles in the markets are not packaged, which indicates that the consumers' need for packaged noodles is not fully met in the markets. Market distance and product availability also have a significant influence on consumers' noodle consumption and improved market structure can stimulate consumers' consumption. In addition, consumers show a strong quality consciousness about the nutritional value and elasticity of noodles.

Tests of the hypotheses on the relation between consumers' variety seeking tendency and demographic variables show that urban consumers have a higher variety seeking tendency than rural consumers do, and more highly educated, higher income, younger consumers also show higher variety seeking tendency. These results suggest that sweetpotato noodle marketing could benefit by diversifying product lines and

offering more variety to particular consumers. Sweetpotato noodle as a traditional foodstuff has not changed for over a century. However, higher variety seeking consumers might look for new, innovative products in the markets.

It appears that demographic variables have no significant influence on noodle consumption. Apparently, noodles are basic food for the Sichuan consumers, and are consumed by young and old alike. While differences in income are not relevant to noodle consumption yet, the greater variety seeking tendency of higher income groups might stimulate a shift toward other basic foods as incomes increase.

Price variable had no substantial loadings on the extracted factors in our factor analysis, so price was not included in the third model analysis. Actually, our survey is cross sectional. Correspondents face the same average market prices at the same periods. Of course, there are price variations between regions and markets. However, the differences in noodle prices during the same period are minimal. Our data set makes it impossible to estimate price influences in a reliable way.

CHAPTER 6

CONSUMERS' PREFERENCES TOWARDS SWEETPOTATO NOODLES

6.1. Introduction

With the rising standard of living, the role of sweetpotato as a staple food in China has weakened during the last two decades. On the other hand, sweetpotato processing activity is growing considerably in sweetpotato growing areas, along with the production of sweetpotato noodles, the main final product. Tens of thousands of households are the basic production units of sweetpotato noodles. The processing activity has become a new income-generating pivot for rural farmers. The majority of the processed sweetpotato noodles sold are yellow, or golden yellow and are not packaged. In recent years, white and nicely packaged noodles have appeared in the supermarkets. The discussions about the noodles' attributes are becoming more intensive. Of particular concern is the packaging and noodle colour. Does the sweetpotato noodle need package? Is it necessary to change the noodle's yellow colour to white? And so on. The major objectives of this study are to analyse consumers' preferences concerning noodle attributes, and to find out the importance of noodle attributes from the consumers' perspective.

6.2 Methodology

6.2.1 Conjoint Analysis

The multi-attribute attitude models and conjoint measurement have dominated the modelling of consumers' preferences about the multi-attribute's choice behaviour. Fishbein's model is the representative of the attitude-toward-behaviour models, while conjoint analysis is a practical technique for measuring consumers' trade-offs among products or services' multi-attributes.

Conjoint analysis is used in this study since 'conjoint measurement can help the marketing manager determine which of a product's or service's qualities are most important to the consumer.' (Green and Wind, 1975). This method has received

considerable attention in academic research and industrial markets. There were about 400 commercial applications every year in the early 1980s and the most frequent usage of conjoint analysis was in the categories of consumer goods, industrial goods, financial services and other services (Wittink and Cattin, 1989).

Conjoint analysis is a multivariate technique used specially to understand how respondents develop preferences for products or services (Hair, et al., 1995). Table 6-1 presents the basic steps in Conjoint analysis.

Table 6.1 The Steps Involved in Conjoint Analysis

Step	Alternative Methods
1. Preference model	Vector model, ideal point model, part-worth function model, mixed model
2. Data collection method	Full profile, two-attributes-at-a time (trade-off tables)
3. Stimulus set construction	Fractional factorial design, random sampling from a multivariate distribution, Pareto-optimal designs
4. Stimulus presentation	Verbal description, paragraph description, pictorial or three dimensional model representation, physical products
5. Measurement scale for the dependent variable	Rating scale, rank order, paired comparisons, constant-sum paired comparisons, graded paired comparisons, category assignment
6. Estimation method	Metric methods (SPSS); non-metric methods (LINMAP, MONANOVA, PREFMAP, Johnson's non-metric algorithm); choice-probability-based methods (logit, probit).

Adapted from Green and Srinivasan (1990).

Basically, three preference models can be specified for the conjoint analysis: vector model (linear), ideal point model (quadratic) and part-worth function model (piecewise linear). The mixed model allows attributes to be treated differently and each attribute to be assumed for a specific model. The linear model is the most restrictive one because it only estimates a single part-worth (similar to a regression coefficient) that is multiplied by the level's value. The curvilinear relationship imposed by the ideal point model is a relatively relaxed assumption and the curves can have an upward or downward U shape. The part-worth form is the most generalised model, which allows for each level of the attribute to have its own estimation. The methods used to collect data can be full profile presentation (all of the

attribute description) or trade off method (comparing two attributes at a time). Full profile presentation is the most popular method due to its reduced number of comparisons, while the use of trade off methods is limited now. For the full profile method, the presentation could include every possible combination of levels, but the results could provide too many alternatives for respondents to rank or rate. Different methods are designed to construct a small subset of all possible combination by neglecting the interaction effects and only estimating the part-worth for all main effects, such as fractional factorial designs. The estimation method in conjoint analysis makes use of regression-like estimation procedures, that is a set of regressions of ranking or rating scores on the profiles.

The conjoint analysis assumes that consumers value a product's utility by adding up the value for each attribute (the part-worths). Respondents only give their overall evaluation for a particular product based on the given product attributes or factors. Therefore, one should carefully select the product's factors and their levels, since the attributes should be the main dimensions or characteristics consumers use to assess the product. The general form of a conjoint model can be shown as (Hair, et al., 1995):

$$\text{Total Worth for product}_{ij..n} = \text{Part-worth of level}_i \text{ for factor}_1 +$$
$$\text{Part-worth of level}_j \text{ for factor}_2 + ...+$$
$$\text{Part-worth of level}_n \text{ for factor}_m$$

Here, the product has a total of m main attributes, and each attribute has two or more levels, (i,j,...n).

6.2.2. Research Design

From a small-scale consumer pre-test as described in Chapter 4, four factors (colour, shape, packaging and price) were identified as the important noodle attributes when consumers make their choices. The four factors and their levels are shown in Table 6.2. The shape of sweetpotato noodles is either fine or wide. Normally, the fine noodles are cooked for formal dishes while the wide noodles are mostly used in a special meal called 'hot-pot'. Farmers produce two different noodle colours: yellow and white. Yellow is the most popular noodle colour. Only further refined starch can be used to make white noodles, therefore these are costly. The majority of yellow noodles are not packaged, while white noodles have plastic packages. '2.6

Yuan per *in*' is the average retailing price of yellow noodles without packaging at Chengdu Markets in 1997, and '5.0 Yuan per *Jin*' was the retail price for white packaged noodles. 3.8 Yuan is a simulation price.

Table 6.2 Variables and Levels in the Conjoint Analysis

Variable Name	Value labels
Shape	a. fine; b. wide
Colour	a. yellow; b. white
Packaging	a. has package; b. no package
Price	a. 2.6 Yuan; b. 3.8 Yuan; c. 5.0 Yuan

Full-profile stimuli are presented to consumers who rank them according to their purchase preferences. The rank scores are then regressed on the profile characteristics. In order to avoid the respondent fatigue of evaluating all 24 combinations (2*2*2*3), a subset of 12 full-profile stimuli was generated from the SPSS Categories Orthogonal Design, in which all main effects are considered and interactions are assumed to be negligible during the model estimation. Table 6.3 presents the 12 full-profile stimuli used in the sweetpotato Conjoint Analysis. Only the first 8 cases are used in the conjoint estimation. The four Holdout cases are also judged by consumers, but are not used when conjoint analysis estimates the part-worth values. The rank scores of Holdout cases will be used for the validation analysis. The last two simulation cases are not presented to consumers, but will be used to predict the two profiles' market share. The two simulation products actually correspond to the existing products in the Sichuan market.

All twelve full-profiles were written on twelve separate cards. Pictures were taken of each card with a noodle sample. These pictures were presented to consumers who were asked to order the picture profiles from the most to least preferred. The interviewer records which picture number is first, which picture number is second, and so on. '1' represents the most favourable one, '12' the least.

In the SPSS Categories conjoint analysis, four different kinds of models may be specified on attributes: Discrete, Linear, Ideal and Anti-ideal models. Discrete is used when no specification relationship is assumed on factors. Anti-ideal model is an upward U shape. 'More' or 'Less' can be added after the Linear or Discrete Model to indicate the expected direction of relationship. In this research, the Discrete model is specified for 'Shape', 'Colour', and 'Packaging', since these attributes are measured

as nominal variables. A Discrete model is also specified for 'Price', since not all consumers necessarily prefer the lowest price, if price is used as an index of product quality.

Table 6.3 Set of 12 Full-profile Stimuli for Conjoint Analysis and 2 profiles used for Simulation purposes

Card number	Noodle Shape	Noodle Colour	Package	Noodle Price	Card Status
1	wide shape	yellow	packaged	2.6	Design
2	fine shape	yellow	not packaged	5.0	Design
3	wide shape	white	not packaged	2.6	Design
4	fine shape	white	not packaged	2.6	Design
5	fine shape	white	packaged	3.8	Design
6	wide shape	yellow	not packaged	3.8	Design
7	fine shape	yellow	packaged	2.6	Design
8	wide shape	white	packaged	5.0	Design
Holdout/Simulation Stimuli:					
9	fine shape	white	packaged	2.6	Holdout
10	wide shape	white	not packaged	5.0	Holdout
11	fine shape	yellow	packaged	3.8	Holdout
12	wide shape	yellow	not packaged	5.0	Holdout
13	fine shape	yellow	not packaged	2.6	Simulation
14	fine shape	white	packaged	5.0	Simulation

6.3 Results and Model fit Assessment

6.3.1 Results

The output shows the part-worth scores for each attribute and the relative importance of this attribute, which determines how influential each attribute is in the consumers' evaluation. The part-worth estimates are scaled on a common scale, the most important factors are those with highest range (low to high) of part-worths. Table 6.4 shows part-worth scores at each level, separately for the urban and rural consumer. The path-worth values are chosen so that the total summed utility of each combination for a particularly profile will correspond to the original ranks as closely as possible.

Table 6.4 indicates a diversity of part-worth estimates for each factor. Both urban and rural consumers value 'fine' shaped noodles more than 'wide' shaped noodles. However, consumers from rural and urban areas have different preferences for the

attribute of 'colour'. Urban consumers prefer the white colour less than the yellow colour, and they strongly value 'package'. Rural consumers do not value the 'package' as much as the urban consumers do. The rural sample has no specific preference for the two colours, but strongly discriminates between the different 'prices'.

Table 6.4 The Part-Worth Results of Conjoint Analysis

Sample	Shape		Colour		Packaged		Price (yuan)		
	Fine	wide	yellow	white	yes	no	2.6	3.8	5.0
Overall (194)	.2229	-.2229	.0268	-.0268	.3441	-.3441	.3196	.0077	-.3273
Urban Consumers (104)	.2260	-.2260	.0721	-.0721	.5409	-.5409	.2019	-.0553	-.1466
Rural Consumers (90)	.2194	-.2194	-.0194	.0194	.1167	-.1167	.4556	.0806	-.5361

If the assumption of the additive model is appropriate, the total utility for a product, for example, Card 2: 'fine, yellow, without package and price at 5.0 Yuan', would be the sum of estimated part-worth for the level of each factors respectively. The profile's total utility would be (0.2260 + 0.0721-0.5409-0.1466) = - 0.3894 for an urban consumer. A negative utility score means that the value of this combination is below the average level. The total utility of each profile should correspond closely to the observed data. A high preference profile should have a high total utility.

In order to provide a consistent comparison, the relative importance scores of each factor are computed by dividing the utility range of the factor by the sum of all range values. The derived individual importance scores for each factor are presented in Table 6.5. As we can see from both Table 6.5 and Figure 6.1, 'Price' ranks as the most important factor and 'Colour' ranks as the least important one for both urban and rural consumers. The different evaluation of factors by urban and rural consumers seems to indicate that rural consumers focus more strongly on 'price' (more than 40%). Urban consumers seem to pay more attention to 'Package' (23%) than rural consumers do. In order to check whether a significant difference exists between urban and rural consumers, further tests were carried out.

Table 6.5 The Relative Importance of Factors

Factors	Overall		Urban Consumers		Rural Consumers	
	Values	rank	values	rank	values	rank
Shape	22.32	2	21.88	3	22.84	2
Colour	17.76	4	17.92	4	17.57	4
Packaging	21.19	3	23.52	2	18.49	3
Price	38.73	1	36.68	1	41.10	1

Figure 6.1 Relative Importance of Factors
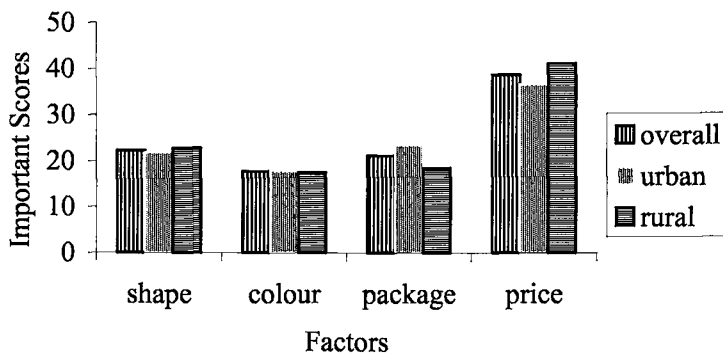
The four factors' importance scores for each subject are recorded individually. The T test is used to check the group difference of urban and rural consumers regarding their factor evaluations. The results are presented in Table 6.6.

Table 6.6 The Difference between Urban and Rural Consumers' Evaluation

Important scores of each factor	T-test for Equality of Means			
	t	DF.	Significance	Mean Difference
Colour	.177	192	.86	.35
Packaging	2.14	192	.033	5.03
Price	-1.61	192	.110	-4.41
Shape	-0.37	192	.711	-.967

The results show that significant differences between the evaluation importance are not observed for the factors 'colour', 'price' and 'shape'. The only significant difference is shown for the factor 'packaging' at 5% level. It can then be concluded that there is a different evaluation of 'package' between rural and urban consumers; that is urban consumers value the 'package' more highly than rural consumers do.

6.3.2 Validation of the Results

Both Pearson's R and Kendall's τ (tau) are generated to indicate how well the specified model fits the data. However, Pearson's R is not useful to evaluate the results since the data are ordinal. Kendall's τ measures the association between the observed and estimated preferences. The model accuracy is assessed on the individual level. Kendall's tau is recorded for each subject. The frequency distribution of Kendall's tau for estimation samples and for 4 holdouts is presented in Figure 6.2. The results show that the model for the estimation sample fits well with a mean of .78. Four holdout objects are used to check the external validity, that is the correlation between actual and predicted preferences for objects not used in estimating the model. Obviously, the model predictive accuracy for the four holdout cases is not as efficient as the original ones.

6.3.3 Simulation Results

Based on estimates obtained from conjoint analysis, the market shares of two simulation profiles are predicted. In the SPSS Categories conjoint analysis, three models (Maximum Utility, Bradley-Terry-Luce(BTL) and Logit model) are used to predict their market share. The Maximum Utility model simply counts the number of the times the product has the highest utility scores. The BTL model computes the probability of choosing a profile as the most preferred by dividing the profile's utility by the sum of all the simulation total utilities. The Logit model is similar to BTL but uses the natural log of the utilities instead of the utilities. The simulation results from the three models are presented in Table 6.7. The last row shows the preference scores for simulated products: Card 13 (fine, yellow, no package and with price of 2.6 Yuan) and Card 14 (fine, white colour, with package and price of 5.0 Yuan).

Figure 6.2 The Frequency Distribution of Kendall's Tau

Kendall's tau for estimation sample

TAU

N: 104;   Mean: .78;   Median: .82;   Std. Dev.: .18

Kendall's tau for 4 holdouts

TAU4

N: 194;   Mean: 0.36;   Median: 0.55;   Std. Dev.: 0.52
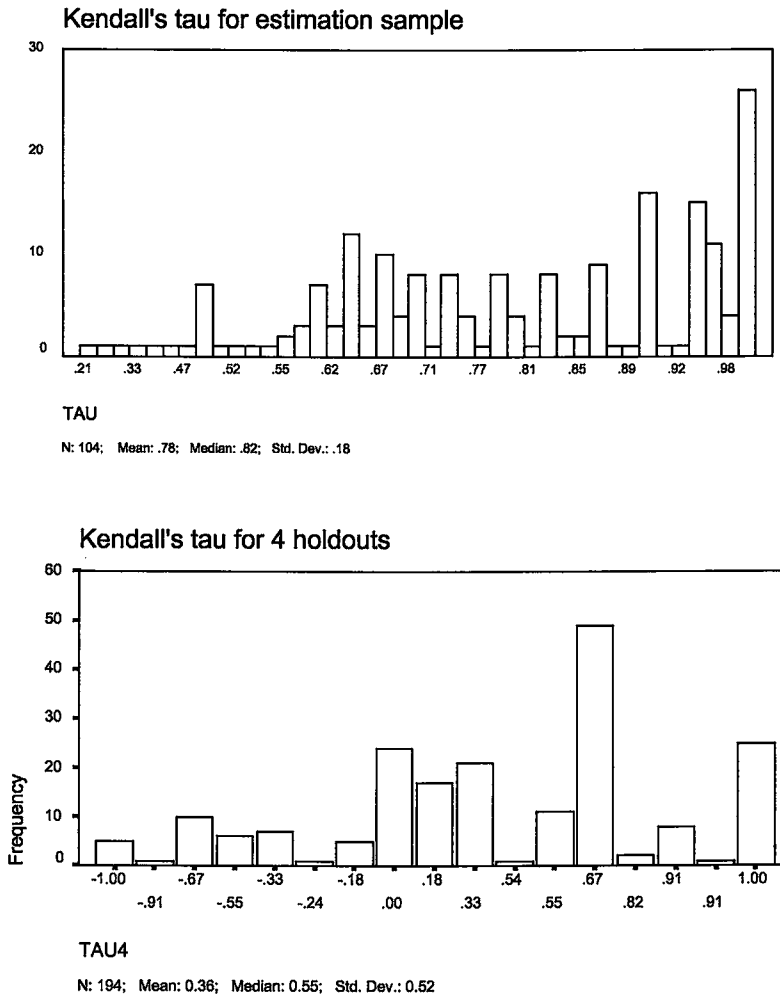
Table 6.7 Simulation Results of Market Share

Models	Overall		Urban		Rural	
	Card 13	Card 14	Card 13	Card 14	Card 13	Card 14
Maximum Utility(%)	47.42	52.58	42.79	57.21	52.78	47.22
BTL (%)	51.31	48.69	46.97	53.03	56.24	43.76
Logit (%)	49.09	50.91	42.42	57.58	56.65	43.35
Predicted Preference Scores	4.6	4.6	4.4	5.0	4.9	4.2

For the total sample, it is difficult to tell which product has a large market share, since the three model approaches generate different results and their predicted scores are equalised at 4.6. However, when we compare the urban result with the rural one, it is

found that all market shares in Card 14 estimated by the three models are higher for the urban sample and are lower for the rural sample. Urban consumers apparently prefer Card 14 with a score of 5.0 while rural consumers will have a large probability of purchasing the product represented by card 13. Remember that Card 13 is noodles with attributes of fine, yellow, no package and at price of 2.6 Yuan, and Card 14 is fine, white colour, with package and price of 5.0 Yuan. Both of them are the existing products in the Chengdu markets. The product labelled with Card 13 is widely sold in the open markets. The product labelled with Card 14 just appeared in recent years and can only be found in large department stores or supermarkets. However, due to the very limited supply, the marketing share of Card 14 is negligible compared with the large quantity transaction of product 13. Nevertheless, product 14 has good opportunities in urban areas according to the predicted leading marketing share.

6.4 Discussion and Conclusion

This study has analysed the importance of sweetpotato noodles' attributes from a consumer's point of view. Four attributes (shape, colour, package and price) were selected as the determinant factors. The Conjoint Analysis results show that 'Price' is the most important attribute, and colour the least. Furthermore, a difference exists between urban and rural consumers regarding the evaluation of 'package'. Urban consumers value 'package' more than rural consumers do. This finding is consistent with the relationship between GDP per person and the different types of food required by consumers. When income per capita reaches $5,000, basic packaged food is required (Steenkamp, 1997).

We should keep in mind that the relative importance of a factor depends on the number of factor levels. It has been shown that a positive relationship exists between the number of levels used for an attribute and the attribute's estimated relative importance (Steenkamp and Wittink, 1994). In our attribute design, all factors have two levels except for 'price', which has three. Therefore, the additional level could increase the derived importance of 'price'.

The simulation output also shows different results for urban and rural consumers. Card 14 (white, packaged fine noodle with price 5.0 Yuan) has a higher market share in urban areas while Card 13 has a higher market share in rural areas. There appears to be a good opportunity for Card 14 noodles to penetrate in the urban markets.

Generally speaking, marketers should pay more attention to noodle package design, and it is not necessary to change noodle colour from yellow to white since consumers do not value noodle colour very highly. The reason is that consumers perceive white noodles as unhealthy products since chemical additives are added for whitening during the processing procedure. Marketing strategy also has to be adjusted for different areas. The market can be segmented between rural and urban. Rural consumers consider price as the most important attribute, whereas urban consumers pay more attention to packaging.

CHAPTER 7

SWEETPOTATO MARKETING SYSTEM

7.1 Introduction

The channel of production and marketing of sweetpotato noodles is described in this chapter. The channel as a system consists of producers, processors and traders whose production and marketing activities are interrelated. From a theoretical point of view, a system is a set of elements which operate together to accomplish an objective. A general model of a system includes input, process and output. The features that define the system form its boundaries. Outside of the system boundaries is the system environment. Each system is composed of several interactive subsystems. Systems can be classified as closed systems and open systems. A closed system is self-contained and does not exchange with its environment, while an open system exchanges information, material or energy with its environment, including random and undefined inputs (Davis and Olson, 1985). Effectiveness and efficiency are two major classes of performance measurements of a system. Effectiveness measures the outputs from the system and represents the reason the system exists. Being effective implies doing the 'right' things or producing the desired result. Efficiency measures the relative cost of producing output, or the use of system resources to achieve results. Being efficient implies the system is operating the 'right' way.

The system approach to agricultural marketing is not a recent topic. In the 1970s, Goldberg (1968) analysed the U.S. wheat, soybean and Florida orange economic systems and showed that co-ordinating institutions play an important role in the agribusiness commodity system. These systems involve production, processing and marketing. Its participants include not only farmers, processors, consumers, but also government, trade associations and academic institutions. The system approach has also been applied to the analysis of agricultural marketing in developing countries (e.g. Janssen, 1986, Goossens, 1994).

With the dramatic changes in global agricultural marketing as we move into a new century, the dynamic systems approach becomes a focus again. Downey (1996) argues that the term 'chain' is less adequate in describing the complex of food and

agribusiness. The 'system' concept is more accurate in characterising the relationships among multiple business entities, concerned with the production and marketing of agricultural products. The purpose of the system approach to food and agribusiness is 'seeking ways of increasing efficiency and profitability through great market co-ordination' (Downey, 1996). Wierenga (1997) suggested that 'a more comprehensive framework than marketing management is needed in agricultural marketing, one which goes beyond the marketing mix optimisation of the individual firm and encompasses the management of its relationship with other organisations.'

7.2 The Framework of the Sweetpotato Marketing System

The framework of the sweetpotato marketing system in Sichuan is presented in Figure 7.1. The sweetpotato system can be divided into three subsystems: sweetpotato producers, sweetpotato processors and traders (retailers inclusive). The three subsystems are interrelated with each other through a series of flows. A flow is a set of functions performed in sequence by channel members (Stern, et al. 1996). In a vertical market system, different flows can be distinguished, such as a flow of products, a flow of property and a flow of information (Bucklin, 1970).

In sweetpotato marketing systems, a physical product flow moves in a downstream direction. Through the processing activities, starch is extracted from fresh roots of sweetpotato, and then extruded in noodles, which finally are eaten by consumers. The property flows often go with the transaction. As the sweetpotato products move along the channel, the property right is transferred from processors to traders and then to consumers. Information flows move both downstream and upstream in the sweetpotato marketing channel, represented by the dotted line presented in the figure.

The characteristics and capabilities of the sweetpotato production subsystem directly influence the processing subsystem by acting as a supplier of inputs for processing activities. The results of market activities will in turn affect sweetpotato production through the supply of agricultural input and price return to farmers. The subsystems of processors and traders are involved in all marketing activities including the marketing functions, such as the exchange functions, physical functions and facilitating functions. At the end of the system is the output of sweetpotato noodles,

which can be assessed by consumers' satisfaction and its contribution to social economic development.

Figure 7.1 Framework of Sweetpotato Marketing System

⟶ : products and property flows.

◀┄┄▶ : information flows.
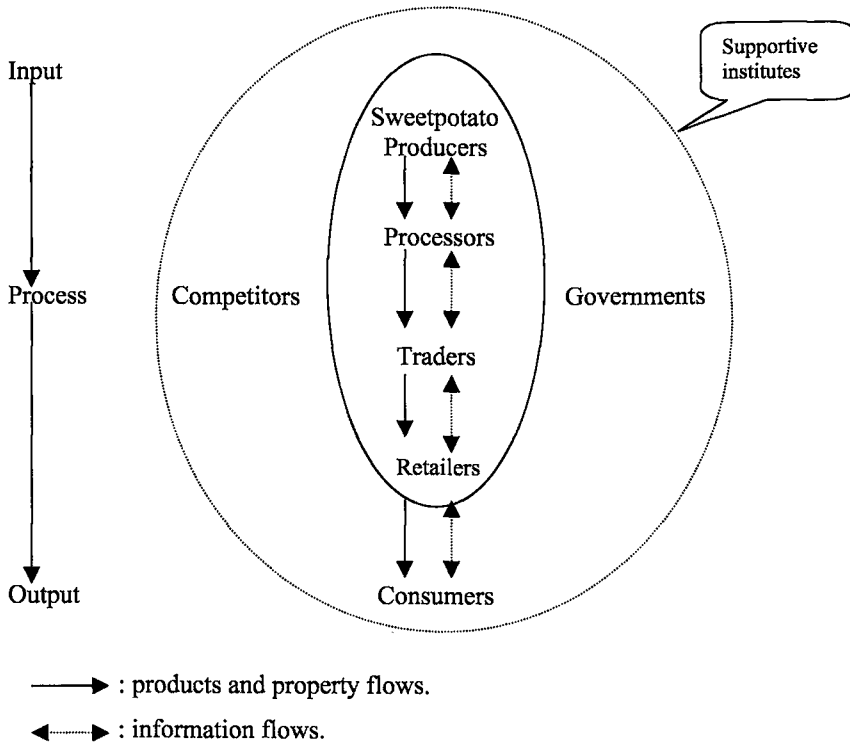
As an open system, the sweetpotato system interacts with its external environment, including the government's influence on the system, consumers' preference, competitors and institutes supportive to the sweetpotato system. Politics has an important macro-environmental influence on sweetpotato processing. Governmental agencies set the rules of marketing activities and in the past also limited the processing activities. These issues have already been discussed in Chapters 2 and 3. Consumer behaviour is decisive for the future of the sweetpotato system and it is affected by economic development and changing cultural norms. Supportive institutes include the processing machines industry, the agricultural input industry supplying materials such as fertilisers, and R&D institutions developing new breeds. Innovation of processing machinery and of technology improves processing with respect to efficiency and product quality. The competitive environment concerns

Sichuan's comparative advantage and disadvantage in the sweetpotato processing industry.

7.3. Marketing Actors in the Sweetpotato Marketing System

The rapid changes in the sweetpotato processing industry in Sichuan have a significant impact on market structure both in number and type of marketing actors, and on the marketing channels in which they are operating. With increasing agricultural production efficiency and more market opportunities, a large number of farmers are becoming actively involved in sweetpotato marketing. They are not only acting as sweetpotato processors, but also as noodle collectors, wholesalers and even retailers. We will describe their operations and functions in the following sections.

7.3.1 Producer/Processor
Chinese economic reforms have resulted in a structural change of ownership in all sectors. The change from prohibiting private commercial activities in the past to the current policy, promoting all types of enterprise ownership, has stimulated millions of rural households to join the processing industry. Twenty four million out of 26 million rural households in Sichuan produce sweetpotatoes in 169 out of a total of 205 counties (Figure 7.2). Based on the interview with government officers and sweetpotato experts, it is estimated that about 40% of the 24 million sweetpotato producing households, i.e. about 9.6 million household units, have processing activities at different scales. This number also includes households who process sweetpotato starch or noodles for their own consumption only. The proportion of sweetpotato processing households engaging in commercial processing is very small. The most optimistic estimate is around 5% from the provincial officers; i.e. there are 480,000 commercial processors in Sichuan. Sweetpotato researchers and lower level officers estimated that only 2% of sweetpotato processors in Sichuan actually carry out marketing activities for processed starch and noodles, which accounts for 192,000 households.

Figure 7.2 The Entities of Sweetpotato Processing in Sichuan
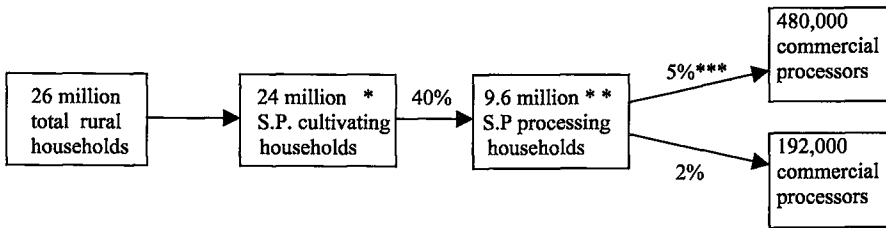
S.P. : sweetpotato.
* : Calculated by author by adding up sweetpotato producing households in different counties. Data is based on Sichuan Statistics Yearbook in 1997.
* *: Estimated by sweetpotato experts in Sichuan. It is estimated that 40% of sweetpotato producing households are engaged in processing activities, and the majority of households process for home consumption at a small scale.
***: 5% is the optimistic estimation by provincial officers about the percentage of processing households who are engaged in commercial processing, and 2% is the lowest estimation by sweetpotato experts and local officers.

There are no data available about the size of sweetpotato processing at provincial level. Table 7.1 gives an insight in the sweetpotato processing for several counties in Sichuan Province. These counties are the most intensive regions of sweetpotato processing activities. The processing data in Table 7.1 refers to the commercial production only. They can offer insight into current processing activities in Sichuan. Column A of Table 7.1 shows the total sweetpotato production for each county in 1996. The noodle production of that year for these selected counties is estimated by local officers to be around 64,600 tons (Column B, Table 7.1). The amount of fresh sweetpotato roots used for noodle production is estimated to be 387,600 tons on the basis of average converting rate of 6:1[3](Column C). So around 8% of sweetpotato is used for commercial processing in these selected areas (Column D). The number of households involved in the commercial processing activities is estimated by local officers to be around 38,000 (Column E). According to the field survey data, the processing activities require on average 4.7 labourers per household. Technically, the processing procedure needs 4 to 5 labourers in order to carry out the processing activities smoothly. Of course, large-scale processors have to hire more labourers. Therefore, the labour involved in sweetpotato processing amounts to 176,720 (Column F). This number does not represent the full-time employment in sweetpotato processing since some of the processors are only seasonally engaged. But this

---

[3] The converting rate is common knowledge and generally accepted in Sichuan's sweetpotato industry.

indicates that at least so many labourers are engaged in processing activities during the peak periods.

The figure for noodle production (64,600 tons) may be an underestimation since local officers admit that it is very difficult to keep tracks of the processing activities due to the rapid expansion in this region. Many processing households that are widely scattered could not be surveyed. Also, farmers usually underreport their noodle production to local officers in order to avoid tax. We can also see from Column D that the proportion of sweetpotato used for noodle processing varies among areas from 1% to 20%.

Table 7.1 Quantitative Importance of Sweetpotato Processing Scale in Selected Areas in Sichuan. (year:1996)

County	A: Sweetpotato production (ton)	B: Noodle production (ton)	C: Fresh SP used for processing C = B * 6	D: % of SP used for processing D = C / A	E: Processing households	F: Processing labourers F=E * 4.7
Anyue	1,500,000	50,000	300,000	20%	30,000	141,000
Santai	900,000	9,000	54,000	6%	7,000	32,900
Yengting	450,000	1,800	10,800	2.4%	N.A	N.A
Suning	1,200,000	2,000	12,000	1%	600	2,820
Shouhong	700,000	1,800	10,800	1.5%	N.A	N.A
Total	4,750,000	64,600	387,600	8.2%	37,600 [#]	176,720 [#]

N.A: not available.   [#]: subtotal of the available data from three counties.

Source: Column A from provincial statistics, Column B and E from county level officers, and Column F (4.7) from the field survey.

7.3.2 Collector

A collector of sweetpotato noodles collects processed sweetpotato noodles from individual household processors. Very often collectors are originally noodle processors and later specialise in noodle collection. They either rent warehouses in the local markets, or store noodles in their own houses. Only very few collectors have their own trucks. Most collectors rent trucks from local transportation companies when needed. Collected noodles are neither sorted nor packaged. Collectors simply bind them into big bundles. The hygienic conditions for these unpackaged noodles are poor.

Collectors pay different prices to processing households depending on the noodle quality, especially the water content and the surface smoothness. Profit margins for collectors are tiny compared to the total added value in the whole distribution channel. Their customers are mainly wholesalers from the capital city Chengdu or other provinces. Box 7.1 gives a case study, which seems representative for how a sweetpotato noodle collector operates.

Box 7.1 A Sweetpotato Noodle Collector

Noodle collector Mr. Lu is a local farmer in Anyue county and has already specialised in noodle collection for more than 10 years. When his town administration transformed a timber business market into a noodle transaction market, he rented a storage house in the town noodle market at a rate of 25 yuan per month. He often visits processing farmers in few nearby villages and makes a verbal contract with them. Processing farmers deliver their noodles to his warehouse at the town market. He then pays them cash based on the noodle quality. Around two third of his collected noodles is transported to Chengdu wholesale markets, while one third is sold anywhere else either within Sichuan or other provinces. His longest trade partnership has already lasted for 10 years. More than 30 noodle collectors rent their warehouses in this town level noodle market. Competition is relatively high. Markets are transparent and prices paid by different collectors at the markets are almost the same.

7.3.3 Wholesaler

Sweetpotato noodle wholesalers are mostly concentrated in the trade markets in the large cities. The provincial capital city Chengdu is the main wholesale market for the distribution of sweetpotato noodles. Five wholesale markets in Chengdu have special sections for the sweetpotato noodle trade. Wholesalers normally order noodles from local collectors by telephone. There are also itinerant wholesalers who may rent a truck to collect noodles themselves in processing areas. Some wholesalers were originally sweet potato noodle producers who now specialise in the wholesale business. Wholesalers are also involved in the transportation process. The most popular means of transport is a truck (mostly rented) with capacity of eight to ten tons of noodles. Wholesalers also use transport by train when very large quantities of noodles have to be transported to other provinces. Transport by railroad is cheaper than by truck but it is not always available due to the inadequate and slowly

developing railway system in China. Another market function the wholesalers perform is the storage function. They normally rent warehouses in the wholesale market and these warehouses can normally store 10 to 15 tons of noodles. Box 7.2 presents a typical picture of wholesalers, their activities, relationships and constraints.

Box 7.2 Sweetpotato Wholesalers in Chengdu Markets

Wholesaler A: An off-farm* farmer from Renshou County. He started his sweetpotato noodle wholesale business based in Hongjilu Wholesale Market in 1990. His noodles are directly supplied by large processors in his villages. In 1997, he only sold 30 tons, 60% within Chengdu and 40% to outsiders. He is complaining that the noodle business has been getting more difficult in the last two years. More and more people are joining wholesaling, and competition is very high. If the situation does not change, he is planning to quit and start another business.   *Wholesaler B: An off-farm farmer from Anyue County. He already started sweetpotato processing in the early 1960s, despite the fact that it was forbidden at that time. When local cadres discovered his processing activities, his noodles were confiscated and he was criticised and forced to give up. In 1978, the government policies allowed farmers to start sweetpotato processing. However, only few families in his village dared to try out the new policy and he was one of the beginners. Now he is a full time wholesaler based in Wukuaishi Wholesale Market in Chengdu. His son helps him to collect noodles in their village. He rents a warehouse of 12 ton capacity. Eighty percent of his products are sold outside of Sichuan while only 20% sold locally. He thinks that the profit margin is very low in the wholesale industry. Given the rising number of competitors, the only way you can survive is to try to sell as much as possible. Therefore, he sometimes travels to big cities to keep contacts with his customers, mostly wholesalers in other provinces. As long as the long-term trust relationships are well established, the business goes smoothly. His customers normally call him to prepare the required amount of noodles three to five days earlier before their trucks arrive. His dynamic behaviour keeps his business going well. However, he strongly expresses that some kinds of decrees are needed in order to regulate market behaviour, particularly for the low price competition among wholesalers.*

Note: an off-farm farmer is a farmer from the statistical administrative point of view. Actually he/she is laid off from the agricultural activities and has to find other jobs instead of farming.

7.3.4 Retailer

The most popular retail markets for sweetpotato noodles are the open markets. They are scattered both in cities and in rural areas. Retailers' main transportation tools are motorbikes and bicycles. Unlike wholesalers who only specialise in one product, retailers often trade other products beside sweetpotato noodles. They often go to purchase at the wholesale market very early in the morning everyday before they open their own outlets. In rural areas, one also can find itinerant retailers who carry bundles of sweetpotato noodles on their bicycles and cycle around from village to village. Sometimes small-scale processing households also sell their noodles themselves in rural retail markets.

Given the absence of information on the market structure of sweetpotato at the provincial level, the market structure in 'Zhouli' township will be given as an example only (Box 7.3).

Box 7.3 Market Structure of Sweetpotato Processing in Zhuoli Town

Zhouli township is situated in Anyue county and has 26 villages with a total population of 45,700. There are more than 13,000 rural households that cultivate sweetpotato in this township, and 95% of them (more than 12,000 households) are engaged in sweetpotato starch or noodle processing. Around half of the starch processors (5,320 households) also process noodles. There are about 140 local specialised noodle collectors. Over 60 noodle wholesalers either order noodles from these noodle collectors or purchase directly from large noodle processors. However it is difficult to estimate the number of retailers.	
Actors	*Numbers*
Producers	*13,039 **
- starch processors	*12,387 **
- noodle processors	*5,320 *;*
Collectors	*137 **
Wholesalers	*62 * **
Retailer	*not available*

* : Data was offered by Zhuoli township.

* * : Calculated by author during the field survey. The 62 wholesalers include 30 wholesalers at the local markets, 32 at four wholesale markets in the capital Chendu, with 18 at *Hongjilu*, 9 at *Wukuaishi*, 3 at *Big Southwest*, and 2 at *Fuheqiao*.

7.3.5 Functions of Market Actors

The classical market functions are exchange functions, physical functions and facilitating functions (Kohls and Uhl, 1980; Downey and Trocke, 1981). Table 7.2 summarises the marketing functions carried out by sweetpotato processors, collectors, wholesalers and retailers.

The exchange functions, buying and selling, are executed at all market levels from sweetpotato noodle processors, collectors, and wholesalers to retailers. Prices are negotiated at spot markets. Markets are basically transparent for actors. Sellers are paid in cash. All wholesale and retail markets open seven days a week, and transactions are carried out from the morning to the evening, even twenty-four hours a day during busy seasons.

Value is added to sweetpotatoes by the physical marketing functions: processing, storage and transportation. Processing is only carried out by sweetpotato processors. Both collectors and wholesalers are strongly involved in transportation, and trucks are the most predominant means of transport. Wholesalers have also to invest in storage by renting warehouses, since they have to store a large quantity of noodles over a relatively long period. Collectors are less engaged in storage than wholesalers since their storage period is relatively shorter and involves smaller quantities. In fact, collectors act as a bridge between processors and wholesalers. They accumulate noodles from processors for a very short period and deliver them to wholesalers. Processors also have to store some purchased raw materials, either fresh roots or processed starch, particularly for large-scale and year-round processors.

All participants in the noodle marketing channel are searching for marketing information, but to a different degree. No official information source is available for the sweetpotato noodles industry; therefore the information search is costly. Wholesalers are seeking information such as noodle prices, transportation prices, supply from processors and demand in the markets, while collectors focus more on noodle market prices and demand in the wholesale markets.

Decline of prices as a result of oversupply in the noodle market is the main risk that processors, collectors, wholesalers and retailers bear. Perishability of fresh roots and processed noodles reinforces risk for wholesalers and processors due to spoilage loss. Collectors bear relatively less risk due to the short storage time of the products they carry. No standardised grading system is available in the sweetpotato industry.

Collectors and wholesalers use their own expertise and experience to judge noodle quality, such as noodle purity, uniformity and water-content. Processors often need to borrow some funds from outside when they set up their business. The main lenders are their family-based relatives. Also, processors often need financial support if they want to invest in processing machinery. Credit delivery can be observed between collectors and processors, and it is also very common between collectors and wholesalers, or wholesalers in Sichuan to wholesalers of other provinces.

Table 7.2 Marketing Functions Carried out by Actors in the Noodle Marketing System

Marketing Functions		Processors	Collectors	Wholesalers	Retailers
E X C H A N G E	Buying	Carried out by all market actors			
	Selling	Carried out by all market actors			
P H Y S I C A L	Transportation	Slightly involved	Substantially involved	Strongly involved	Slightly involved
	Storage	Slightly carried out	Substantial quantity, short period	Large quantity, long period	No importance
	Processing	Uniquely carried out	N.A.	N.A.	N.A.
F A C I L I T A T I N G	Marketing information	Less concerned	Much concerned	Very much concerned	Less concerned
	Risk bearing	Much risk	Less risk	Most risk	Least risk
	Standardisation and grading	Not carried out	Slightly carried out	Slightly carried out	Not carried out
	Financing	Most needed	Credit delivery to processors	Credit delivery to collectors or other wholesalers	Less needed

N.A. : no activities carried out.

Comparing the performance of many functions in the marketing channel of sweetpotatoes, wholesalers play a very important role in almost all marketing functions. They are heavily involved in transportation and hold a large storage volume. In order to reduce their high business risk, they are eager to obtain accurate market information. The marketing function carried out least is standardisation and grading. The lack of a grading system leads to less profit return for higher quality noodles.

7.4 Distribution Channels

7.4.1 Types of Distribution Channels

Alternative distribution channels of sweetpotato noodles from processors to individual consumers are shown in Figure 7.3.

Figure 7.3 The Distribution Channel of Sweetpotato Noodles in Sichuan Province
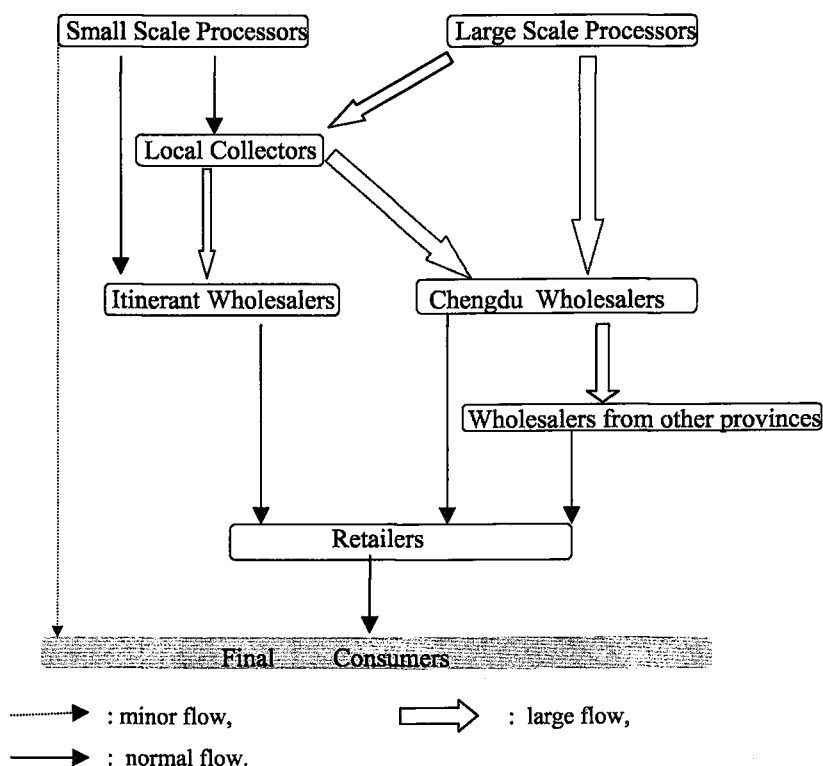
The basic marketing channel for sweetpotato noodles is the channel from processor, via collector, wholesaler and retailer to final consumer. However, the processing capacity of processors may lead to other choices of distribution channels. Small-scale processors may sell noodles to individual consumers directly. Large-scale processors often deal straight with wholesalers. A small number of large processors might set up

their own selling office in Chengdu wholesale markets. There are also 'itinerant wholesalers' who collect noodles at farm gates.

The vertical differentiation of a channel may be influenced by factors, such as the size of the market served, distance and so on (Dijkstra, 1997). Five types of marketing channels can be distinguished for sweetpotato noodles on the basis of the size of the market served, distance between production and consumption area, and the number of levels in the channel emerged in relation to these factors (Table 7.3). In our table we do not consider 'consumers' as a channel level since consumers are not the element of the market channel as a system. Most sweetpotato processors are actual farmers and they are located in the rural areas. Markets are concentrated in the big cities where the urban population is the main consumers. The geographic distance between rural and urban areas stimulates involvement of intermediate traders (wholesalers and retailers). The scattered individual processors at household level call for the appearance of collectors. A large distance between provinces in China requires even more successive wholesalers in the marketing channel.

Table 7.3 Types of Distribution Channels for Sweetpotato Noodles

Items	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Levels	4	5	3	1 or 2	1
Size of market served	More than 100 million Sichuan consumers	Chinese consumers outside Sichuan	Similar to Channel 1	Tens of thousands of consumers	Hundreds of consumers
Transportation Distance (km)	200-500	5,00 to 2,000	200 – 500	Around 20	2 to 5

The first distribution channel is the most important and has four levels: *processor—collector—wholesaler—retailer—*consumer. The noodles are transferred through four owners before they reach consumers. Collectors collect noodles from individual processors in the rural areas, then deliver them to wholesalers, through retailers to individual consumers. The market served mainly covers Sichuan Province and the transportation distance of sweetpotato noodles is around 200 to 500 km. It is the most common distribution channel among the five since more than half of the noodles are estimated to be consumed within Sichuan Province.

The second distribution channel has five levels*: processor—collector—wholesaler1—wholesaler2—retailer—*consumer. This is a very important inter-provincial distribution channel since local wholesalers from the survey estimate that

around 40% of sweetpotato noodles produced in Sichuan are exported to other provinces. Wholesaler 1 refers to the exporting wholesaler in Sichuan Province, and wholesaler 2 is the importing wholesaler in other provinces. Wholesaler 2 often buys noodles from wholesaler 1 via telephone if a long-term relationship exists between them. When the quantity and prices are negotiated, wholesaler 2 either travels to Sichuan with his own trucks, or wholesaler 1 ships noodles via train or hired trucks to the assigned locations. Noodles could be delivered to the far northern areas in Xinjiong Autonomous Regions, and to the south as Guongzhu Province. The transportation distance ranges from 1,000 to 2,000 km. How the sweetpotato noodles reach the final consumers in other provinces is not included in this study. It is possible that more intermediate traders may be involved and the number of channel levels may be even more than five.

The other three channels are special cases and are relatively less important in the distribution system. The third channel is one used by large-scale processors: *large scale processor—wholesaler—retailer—*consumer. In this case, the function of collecting noodles has disappeared and wholesalers have direct contact with large-scale processor without collectors in between. The fourth channel is *processor — wholesaler—canteen or restaurant* with or without wholesalers. This channel differs from others through the absence of retailers and the type of final customers. They are not individual consumers, but restaurants, work unit canteens, etc. Since a popular meal called 'hot-pot' in Sichuan requires sweetpotato noodles, 'hot-pot' restaurants normally purchase a large quantity of sweetpotato noodles directly from processors or wholesalers (depending which is more convenient). The travel distance is shorter (within 20 km). No retailers are involved in this channel. The last channel is *small processor—*consumers. This is the shortest one with only one level. Small processors sometimes go to the open markets nearby and sell their noodles themselves. The travel distance is from 2 to 5 km walking or cycling and consumers are local residents.

7.4.2 The Co-ordination Mechanism in the Distribution Channel

In an economy in transition, marketing channels can be classified into three types of marketing systems. There are still some centrally planned channels, but gradually conventional channels co-ordinated by market prices are becoming more important. Some vertical marketing systems are also emerging where, in addition to price

formation, other co-ordination devices are used to organise the marketing system. The distinction between the three marketing systems in terms of actors, objectives, policy and co-ordination mechanism is summarised in Table 7.4.

In a centrally planned distribution channel, government agencies are the decision makers. Their objective is to fulfil the government targets given the available supply, which in its turn is strongly influenced by government policy. Before the economic reforms in 1978, sweetpotato farmers were forbidden to engage in any marketing activities. Only state/collective-owned enterprises were allowed to process sweetpotatoes into starch and noodles. State food companies were the legal purchasers in the distribution channels and consumers could only purchase the processed noodles in the state shops.

Table 7.4 Three Distribution Systems

	Centrally Planned Distribution System	Conventional Marketing Channel	Vertical Marketing System
Actors	Government agencies	Small firms	Medium size companies
Objective	Government targets	Individual profit	System profit
Policy/Conduct	Governmental command	Operational transaction relationship	Strategic partner relationship
Co-ordination Mechanism	Governmental policy	Prices	Prices, administrative contract integration, trust

After market liberalisation, distribution channels of sweetpotato noodles became more diversified. Private processors and traders are the main marketing actors and have become actively involved in the marketing channels, while the roles of state agencies are withering. Marketing channels are evolving toward the Conventional Marketing Channel (CMC). Members in CMC are independent profit seekers. Markets are cleared through bargaining over prices and volume. Commitment and loyalty of actors in the network are relatively low.

Most marketing activities of sweetpotato processing are executed independently. Processors, collectors and wholesalers/retailers are pursuing profits at their own stage in the marketing channel. There are no entry barriers set by governments. One can easily join the channel with limited financial resources and set up a business.

At present conventional marketing channels are still dominant in the sweetpotato noodle industry. However, a new phenomenon in the sweetpotato marketing system is the appearance of administered marketing systems. This system implies an in-depth collaboration among channel members and requires intensive communication and co-

operation. All channel members are loosely connected through informal collaboration. Each channel member is independent but 'there is at least a minimum amount of system wide orientation among the members of the channel.' (Stern, et al., 1996. p.238). This kind of informal collaboration in the distribution channels can be found in the sweetpotato processing industry in Sichuan although it is still the exception rather than the rule. Several large-scale processors act as 'administrators' in the system. They possess non- coercive market power by offering other channel members technology support and consultancy. Box 7.4 provides an example of an administered vertical marketing system.

Box 7.4 An Administrator in the Marketing Channel

Mr. Zhuo used to be a local officer in charge of the promotion of processing sweetpotato in Santai County of Sichuan Province.   In the early 1980s, he gave up his government job and set up his own sweetpotato noodle business. He has gradually built this up and now he has a sweetpotato processing factory, a factory making processing machinery, and a sweetpotato processing training centre employing over 70 staff. Farmers study processing skills at his training centre and afterwards they buy processing equipment in his machinery factory. He develops a marketing network by offering technology services or giving permission to use his packages under his brand name (merchandising agreement). His headquarters also serve as an information centre. He provides his network members with information on noodle price and market demand. His noodles are distributed directly to large food shops or supermarkets in Sichuan and have a relatively high profit margin due to the good quality. The individual trainees operate their processing units independently and loosely collaborate with Mr. Zhuo's centre one way or another. The administrative vertical marketing integration requires communication and trust between members and does not need any formal contracts or commitment.

Another phenomenon in sweetpotato processing is the family-based administrative vertical marketing system. In order to reduce transaction costs to a minimum level, two or three family-based households work together. They may jointly purchase processing machines, share their market networks, give loans each other and operate at different channel levels. For example, one family is concentrated in the wholesale market while the other family is responsible for noodle collection. They sometimes control the whole market channel from production, collection, transportation and

wholesaling. This family-based operation is very popular in Anyue County. Almost all Anyue wholesalers in Chengdu markets have their relatives collecting noodles for them. If a wholesaler in Chengdu markets receives a large order, one telephone call to his relatives in the hometown can bring products to Chengdu quickly. The system works very efficiently and it can lower the transaction cost and increase value for the channels. This mechanism can be traced back to China's traditional family values. The lack of formal marketing information, the trust and easier communication among family members all stimulate the development of family based business.

In summary, with the vanishing of the centrally planned distribution system, the conventional marketing channels have become dominant in the sweetpotato processing industry, although different types of informal collaboration, such as the administrative vertical marketing system and family-based co-operation, can be observed to be a minor extent as yet. The majority of the channel members still operate independently. Their transaction activities are price-driven and self-oriented. Therefore, at this stage of the economy in transition, it is very important to improve the effectiveness and efficiency of conventional marketing channels, in particular, the access of channel actors to market information.

7.5 External Environment

Having discussed consumer behaviour and some aspects of government interference with sweetpotato choices, we will focus our discussion of the external environment to the system's supporting environment, which facilitates sweetpotato processing activities and contributes to the fulfilment of marketing functions. The supportive environment of sweetpotato industry includes a great number of institutions: infrastructure such as power and electricity supply to the agricultural input industry, e.g. companies in plant protection and in fertiliser supply. These infrastructure elements belong to the common environments of the entire agricultural sector. In this section we will focus on the institutions specifically relevant to the sweetpotato industry. They include the main sweetpotato breeding institution: Sichuan Academy of Agricultural Sciences (SAAS), and relevant government bureaux in charge of the sweetpotato industry administration. Afterwards, elements of the competition environment of the sweetpotato processing industry are discussed.

7.5.1 Environment Supportive to the Sweetpotato Industry

Sichuan Academy of Agricultural Sciences (SAAS) is the main sweetpotato R&D institution in Sichuan Province. Its research activities focus on the breeding and cultivation of four principle crops in this region: rice, wheat, maize and sweetpotato. In the last few decades, they have promoted the efficient Wheat-Maize-Sweetpotato crop rotation system and its cultivation method. A series of new sweetpotato varieties with high yield and disease resistance were also bred in their laboratories and widely adopted by farmers, such as the current leading variety ChuanXu 27. There is also a special department named 'Sweetpotato Processing Research Centre' in SAAS. Its main objective is to develop sweetpotato processing technology and processing machinery in order to improve sweetpotato noodle quality in Sichuan Province. In addition to developing noodle processing technology, they have also developed a few new sweetpotato products, such as sweetpotato chips, candies, biscuit and so on. The R & D of SAAS collaborates closely with the International Potato Centre (Peru) and has made a great contribution to the development of sweetpotato processing in Sichuan Province.

The Department of Agriculture (DOA) in Sichuan Province is officially responsible for sweetpotato production at the provincial level. During the command economy period, it enacted and implemented annual planning of sweetpotato production for each county, from the planting areas, cultivating time, varieties used to the final harvest. However, individual households have now become responsible for their own crop production since the reforms in 1978. DOA does not carry out detailed planning anymore although sweetpotato statistically still accounts for 10 percent of the provincial grain production at a conversion rate of 5:1 (5 kg fresh sweetpotato equivalent to 1 kg grain). The job of DOA now is to promote the adoption of new sweetpotato varieties and high cultivation technology extension while working closely with academic institutes and agricultural extension stations. Favoured policies, including special loans and tax exemption for processing activities, are adopted to stimulate processing sweetpotato. For example, a skilled farmer in Anyue County received a 6 million yuan loan in 1997 from the Bank of Agriculture at half the interest rate of commercial loans for his investment in a sweetpotato processing factory. This new factory is planned to produce 2,000 tons of high quality sweetpotato starch and 300 tons of sweetpotato noodles annually. Clearly, the poor infrastructure

and communication systems in Sichuan Province require further government support and investment.

The Bureau of Industrial and Business Administration (BIBA) used to be a state agency specialised in the registration administration of enterprises, such as issuing licences, collecting all kinds of management fees, setting market orders and so on. With the economic development and market liberalisation during the last two decades, BIBA has enhanced the fulfilment of marketing functioning and become more market focused. They currently act as state agencies in organising market functions. All sweetpotato noodle wholesale markets and large open markets in Sichuan Province have BIBA branches or offices. The main objectives are to manage and regulate the millions of active markets scattered around urban and rural areas. The present tasks of BIBA can be summarised as managing and inspecting markets, seizing fake products in the markets and stopping the appearance of unhealthy competition behaviour. BIBA also collects market data, such as noodle transaction volume and prices. However, these data are mainly for administrative purposes, e.g. exchange information with other markets or reports to governmental agencies, and not for commercial usage.

7.5.2. Competitive Environment of the Sweetpotato Processing Industry

The competition environment can be analysed from different perspectives, such as the industry's internal rivalry, product substitutes, external physical conditions, and so on. We will assess the competitive position of the sweetpotato processing industry on the base of Porter's 'diamond' model (Porter, 1990) since this model was analysing competition from a broad concept and for that matter suitable for competition at sector level (Figure 7.4). In line with Porter's model, four determinants will influence the competitive advantage of the sweetpotato processing industry. These are (i) factor conditions, (ii) strategy, structure and rivalry, (iii) demand conditions, (iv) related and supporting industry (and indirectly government and change). The four determinants have an interactive relationship.

Figure 7.4 Competitive Position of Sweetpotato Processing Industry in Sichuan Province Based on Porter's 'Diamond' Model
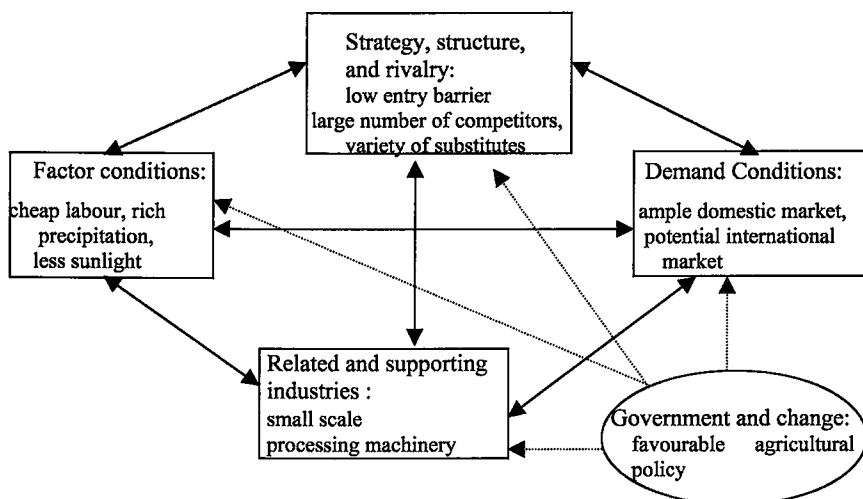
Basically, one might argue that competition in the sweetpotato noodle industry originates from a great many factors, including substitutes, such as wheat noodles and rice noodles. We focus our analysis on the competitive position of sweetpotato processing industry in Sichuan vis à vis the second largest sweetpotato province Shandong. Sichuan and Shandong are the No.1 and No. 2 sweetpotato producing provinces in China. Both produce more than 20 million tons of fresh sweetpotato roots annually, which means they both enjoy a plentiful raw material supply for sweetpotato processing with Sichuan ahead of Shandong. They may compete in exporting to other provinces.

The competitive factor conditions normally refer to competitors' physical resources, human resources and knowledge resource. Table 7.5 presents some factors for comparison between the two provinces. The comparison of labour cost is based on the average wages for employees in collective enterprises, and it is much lower in Sichuan (3,419 yuan) than in Shandong (3,973 yuan). The labour cost may be determined by several factors, such as the labour supply market and the quality of labour. Some agroclimatic conditions are also listed for comparison in the table. The subtropical humid climate in Sichuan Province is beneficial to sweetpotato cultivation. Average temperature and precipitation in Sichuan are higher than in Shandong. The uneven rainfall distribution in Shandong often causes drought in the spring when sweetpotato is cultivated. Nevertheless, the flat and fertile lands in Shandong produce higher yield of sweetpotato than Sichuan's hill regions. Sunlight is

a very important factor in sweetpotato processing. Shandong enjoys many more sunlight hours than Sichuan, which makes the drying procedure of sweetpotato processing much easier in Shandong than in Sichuan.

Table 7.5 Comparison of Some Factors between Sichuan and Shandong Province

Factors	Sichuan Province	Shandong Province
Sweetpotato Production	Around 25 million tons	Around 20 million tons
Labour Cost (yearly wages)**	3,419 yuan	3,973 yuan
Sunlight (h)*	1,800	2,370
Precipitation (mm)*	1,240	760
Temperature (^{0}C)*	16.6	13.8

* : data from Wang Shudian, et al. (1984).
** : Sources: China Township Enterprise Statistic Yearbook, 1998.

The degree of rivalry in the sweetpotato processing industry depends on its market structure. The internal industry structure is quite similar between Sichuan and Shandong provinces, in which millions of individual households are the main sweetpotato noodle processors, except for the few large-scale processing factories in both provinces. On the market side, there are tens of thousands of collectors, wholesalers and retailers. The huge number of buyers and sellers implies a higher degree of competition in the sweetpotato processing industry. The rapid increase of household processing of sweetpotato both in Sichuan and Shandong provinces in the last two decades is an indication of a low entry barrier in the sweetpotato processing industry. Noodles made from rice, wheat, canna, pea beans and potatoes are also available in the markets, in addition to sweetpotato noodle. These noodles can be substituted to a large degree, which enhances the competition rivalry for the sweetpotato industry.

With regard to the demand side, Sichuan and Shandong are the main players in the domestic markets since they are the main sweetpotato noodle processing provinces and their sweetpotato noodles are sold all over China. The demand for sweetpotato noodles within Sichuan Province is likely to remain stable with a slightly increasing trend. Our field survey shows that during the last five years in Sichuan, 63% of consumers did not change their noodle consumption, 25% of them increased and the rest 12% declares that their noodle consumption decreased. When we look at the domestic markets, there is still ample room for demand expansion. However, market outlets for noodles from the two provinces may differ to certain extent. Most

sweetpotato noodles in the supermarkets are produced in Shandong and it is hard to find sweetpotato noodles from Sichuan in supermarkets. In addition, sweetpotato noodle producers are also exploring the international markets. Consumers from neighbouring countries, such as Japan and South Korea, also share the common perception of sweetpotato and its processed products as Chinese. Sweetpotato processors in Shandong have already started to export their sweetpotato noodles to South Korea and Japan. Of course, Shandong enjoys lower transaction cost in these exports given its geographical location on the coast compared with the inland location of Sichuan. South Korea not only imports sweetpotato starch from Shandong, their consumers also very much like the processed sweetpotato noodles. Sweetpotato noodles produced in Sichuan are consumed domestically, and do not yet have international markets.

Processing machinery is the main supporting industry for sweetpotato processing. Both Sichuan and Shandong produce a variety of processing machinery for small-scale household processors. During the last decade, sweetpotato processing machinery has been rapidly developed in Sichuan. These machines can carry out all processing procedures from fresh root washing to final packaging of dry noodles. However, the adoption of processing machinery at household level depends on various aspects, such as the machines' quality and farmers' financial resources. In Shandong, several factories have already invested in large scale processing equipment, which could produce a stable supply of higher quality noodles.

Government policy is of particular importance for the sweetpotato industry, as it directly leads to the opening or closing down of sweetpotato processing industry. Currently, the central government is promoting 'agricultural industrialisation', which is intended to add value to agricultural products by processing and marketing. This policy is very consistent with sweetpotato processing and has been widely adopted by both the Sichuan and Shandong governments.

In summary, the sweetpotato industry in Sichuan Province has both its competitive strengths and weaknesses. It enjoys good physical conditions for sweetpotato production in terms of its subtropical climate, and produces a rich raw material supply for the processing industry. However, the shortage of sunlight in Sichuan adversely affects the drying procedure of noodle processing. The internal (within Sichuan) and external (from other provinces) competition rivalry is very high for the sweetpotato processing industry in Sichuan Province given its large number of competitors, low

entry barrier and many substitute products. Sweetpotato noodle processors in Sichuan also feel the market pressure from the aggressive expansion of the Shandong noodle markets. Processors in Shandong have been extensively exploring new opportunities in supermarkets and international markets. Nevertheless, there is still ample market room for Sichuan's sweetpotato noodles. Of course, more efforts have to be made in order to expand Sichuan' sweetpotato noodles into international markets, such as with respect to noodle quality improvement and production scale increases. This also requires large investment in the Sichuan noodle processing industry to ensure a stable supply and constant quality of noodles.

CHAPTER 8

PERFORMANCE ANALYSIS OF SWEETPOTATO MARKETING CHANNELS

8.1 Introduction

Studies about the performance of an industry/sector or economy originate from industrial organisation theory. A popular concept is the Structure-Conduct-Performance (SCP) paradigm (Scherer & Ross, 1990; Carlton & Perloff, 1994). The primary focus of this approach is to evaluate the relationship between market structure, market conduct and market performance in an industry or sector. The pioneering work was done by Bain, in which he investigated several U.S. industries and found a positive relationship between industrial concentration and their profitability (Cubbin, 1988). The SCP paradigm postulates a causal relationship between market structure, market conduct and performance: the economic performance is determined by the conduct of firms, which in turn depends upon the market structure. This approach has received wide criticism because of the simplicity of the single direction of causality. In the last few decades, economists have continuously attempted to relate market structure to measures of performance from a more dynamic point of view (e.g. Ferguson and Ferguson, 1994; Lutz, 1994).

Instead of measuring the performance of a company or sector in relation to market structure, many researchers have measured the marketing performance directly (see for instance Bonomo and Clark, 1988). Performance analysis can also focus on marketing channels. Stern et al. (1996) propose that performance measures in a marketing-channel context should include three elements: effectiveness, equity and efficiency. Effectiveness measures how well channel members deliver service outputs required by end users. Equity is the extent to which the final users have the same opportunity to use, and the ability to access the existing marketing channels, particularly disadvantaged or geographically isolated consumers. Efficiency measures include both productivity efficiency and financial efficiency.

Market performance analysis becomes a richer and broader concept when a country is in transition toward a market economy. The introduction of the market as a co-ordinating mechanism in China has an apparent impact on the whole economy. Compared with the rigid distribution system during the period of the planned economy, more marketing channels are available now to serve end users better. Nowadays, the society's resources are allocated to a large extent according to market forces. About 70% of labour allocation and about 60% of product pricing and distribution are influenced by market forces in contemporary China (Lawrence, 1998).

The performance of sweetpotato marketing activities is the subject of this chapter. The permission given to households by central government to process sweetpotato and to be engaged in marketing activities at household level came only after the economic reforms began. Sweetpotato marketing activities expanded rapidly during the last two decades. The performance analysis in this chapter is mainly concerned with channel effectiveness and efficiency since the introduction of markets. It also tries to evaluate the impact of these changes on social and economic development.

Channel effectiveness will be analysed by assessment of service outputs at consumer level (section 8.2). Since wholesalers play a central role in the distribution channels, case studies of the efficiency of some wholesalers from Chengdu wholesale markets are investigated (section 8.3). In addition to the channel performance, the impact of marketing activities on marketing integration and economic development at sector level will be assessed in Section 8.4 and Section 8.5 respectively. Finally, some attention is paid to creation of employment opportunities, generation of rural income and diversification of sweetpotato utilisation.

Although our analysis of effectiveness and efficiency focuses on the sweetpotato industry in Sichuan Province, our results may have relevance to similar crops such as potato and canna in Sichuan, or even other regions in China. This is due to the similarity of products and the analogous market structure of the processing industry.

8.2 Effectiveness Measurement of Service Outputs of the Sweetpotato Marketing Channel

Service outputs provided to end users by a marketing channel can include many items, such as stability of supply, maintenance of product quality, availability of information, market decentralisation, lot size, delivery or waiting time, product variety and assortment, and so on (Stern, et al.1996). Different consumers may have special focus on these service outputs. In this section, outlet choice, spatial convenience and product availability for sweetpotato noodles are assessed since they are basic service outputs required by consumers in Sichuan Province.

8.2.1 Choice of Outlet for Noodles

As already described in Chapter 2, the advent of the market economy in China has brought more market outlets for consumers compared with the planned economy period. The ability to deliver services that are in demand has greatly improved. State owned grocery stores were the main market outlets for sweetpotato noodles before the reforms. However, new market outlets, such as supermarkets and open markets, have appeared or were reopened with market liberalisation. Consumers' needs and wants have been largely met given the large numbers of available market outlets and the wide choice of variety products.

Grocery shops were the main traditional retailer outlets for foodstuffs during the central planning period and are scattered around neighbourhoods. Supermarkets have become more important and even popular in urban areas during the last five years in China. Some traditional grocery shops are being converted into supermarkets and this trend will continue. Open markets have been developed rapidly since the economic reforms and have become the most popular market outlets due to the wide variety of choice and fresh products. Department stores are normally located in the centre of towns and often contain a food section.

In order to identify consumers' noodle choice among these market outlets, consumers were asked to report the outlets where they normally buy their noodles. In order to better understand the market position of sweetpotato noodles, the main substitute product – wheat noodles – has also been included in the analysis. Multiple choices for noodle outlets were allowed. The frequencies of consumers' noodle

choices at the four market outlets are summarised in Table 8.1 for sweetpotato noodles and Table 8.2 for wheat noodles.

Table 8.1 Consumers' Outlet Choices for Sweetpotato Noodles (n=220)

Outlets	Choice 1		Choice 2	Total	
	Freq.	%	Freq.	Freq.	%
Grocery Shop	35	16	-	35	15
Supermarket	6	3	4	10	4
Open Market	169	77	14	183	77
Department Store	9	4	-	9	4
Total	220	100	18	238	100

Source: Author's field survey, 1997.

Table 8.2 Consumers' Outlet Choices for Wheat Noodles (n=259)

Outlets	Choice 1		Choice 2		Choice 3	Total	
	Freq.	%	Freq.	%	Freq.	Freq.	%
Grocery Shop	102	39	4	9	-	106	33
Supermarket	16	6	11	23	1	28	9
Open Market	94	37	32	68	9	135	42
Department Store	47	18	-	-	5	52	16
Total	259	100	47	100	15	321	100

Source: Author's field survey, 1997.

The tables show that the relative importance of noodle outlet choice differs substantially between sweetpotato noodles and wheat noodles. For sweetpotato noodles, choice ranges from 4% for the supermarket store to 77% for the open market. Apparently, consumers purchase both sweetpotato noodles and wheat noodles most frequently in open markets: 77% of consumers purchase sweetpotato noodles at the open markets whereas 42% of consumers buy wheat noodles at the open markets. Consumers purchase wheat noodles not only from the open market, but also in grocery shops (33%) or department stores (16%). Compared with the choices of wheat noodle outlets, sweetpotato noodle purchasing is highly concentrated in the open market. It is interesting to notice that purchasing in a second outlet is negligible for sweetpotato noodles, but not for wheat noodles. The main reason for the low choice in supermarkets and department store is that

sweetpotato noodles are not available yet in these market outlets due to the quality and packaging issues.

The improvement of marketing effectiveness can be inferred from the shift of market outlet choice from traditional grocery shops to open markets. During the centrally planned economy, state-owned grocery stores were consumers' principal outlet choices for foodstuffs. Market liberalisation resulted in structural changes in market outlets. The competitive open market offers consumers better value for money than the bureaucratically managed state owned stores. The change in retail structure also offers consumers more freedom, implying more outlet choices.

8.2.2 Consumers' Satisfaction

Spatial convenience and product availability are evaluated in order to further improve the understanding of end-users' satisfaction with service outputs of market outlets for noodle products. . For comparison purposes, sweetpotato noodles and the near substitute wheat noodles were chosen for the investigation. Two statements measuring the market distance and product availability are 'I do not need to go far to buy xxx noodles' and 'xxx noodles are always available in the markets'. Consumers were asked to rate these statements on a five-point Likert scale from '1' as 'totally disagree' to '5' as 'totally agree'.

Table 8.3 The Evaluation of Market Services: Distance and Availability (N=260)

Distribution Variables	Noodles	Mean	Std. Deviation
Market Distance	Wheat noodles	4.15	.64
	Sweetpotato noodles	3.70	.95
Market Availability	Wheat noodles	4.17	.71
	Sweetpotato noodles	2.73	1.21

The evaluation of specific marketing services for both sweetpotato noodles and wheat noodles are presented in Table 8.3. Consumers' evaluation of distribution channels of wheat noodles for both items is higher than that of sweetpotato noodles. Consumers' score for wheat noodles is 4.15 for market distance and 4.17 for product availability, while the scores for sweetpotato noodles are lower: 3.70 for distance and 2.73 for availability. An analysis of variance shows that these score

differences are significant at the 0.01% level, both for spatial convenience (F =39.68) and product availability (F = 275.72). Compared with wheat noodles, consumers have to travel relatively far to buy sweetpotato noodles, and even then, sweetpotato noodles are not always available in the markets. However, 'Distance' seems to be less a problem than 'Availability' for sweetpotato noodles since the mean score for market distance is more acceptable (3.7) than that of product availability (2.7). Therefore, logistics improvements for sweetpotato noodles should be aimed at ensuring a stable supply in the markets. The greater satisfaction for wheat noodles may be due to the types of market outlets. More than 50% of the consumers purchase wheat noodles in other shops than open markets. Apparently, these shops can guarantee a better product supply.

In summary, the service outputs meet consumers' demand better since the marketing reforms, as consumers now have access to more and different types of market outlets. However, there is still room for further improvement: more progress can be made in delivery of sweetpotato noodles by improving logistics to ensure a stable supply of products in the markets.

8.3 Efficiency Measurement of Wholesalers

Wholesalers play an important role in the transition toward a market economy. They are the pivots in the distribution networks of sweetpotato noodles and fulfil a series of market functions, such as accumulation, transportation, storage and information collection.

8.3.1 Strategic Profit Model

There are different elements in measuring efficiency, including asset turnover, return on investment, liquidity and so on. Return on investment, or profitability, is accepted as an aggregate measure of profitability in the retail and wholesale trades. The Strategic Profit Model (SPM) has been suggested for measuring retailers or wholesalers' financial performance (Figure 8.1 as presented in Stern, et al. 1996).

Lack of available data prevents us from applying the SPM to a representative sample of wholesalers. However, three wholesalers were selected for a case study representing a small, medium and large size wholesaler respectively. From the six wholesale markets in Chengdu having a sweetpotato noodle section, *Hongjilu* and *Wukuaishi* are the two main markets(see also Box 7-3). Three wholesalers were

chosen from these two wholesale markets to measure wholesaler efficiency using some elements of the SPM. These are presented in Table 8.4. Lack of data limits our use of SPM variables to net sales, gross margin, total expenses, net profit and profit margin.

Figure 8.1 The Strategic Profit Model
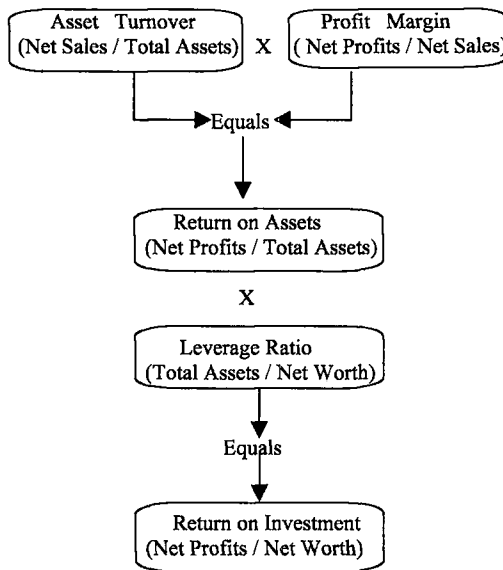
Legend:
Net Sales = Gross Sales - Customer Returns - Customer Allowances
Gross Margin = Net Sales - Cost of Goods Sold
Net Profit after Tax = Gross Margin - Total Expenses - Taxes
Net Worth = Total Assets - Total Liabilities
Source: Stern, et al. 1996.

Table 8.4 The Calculation of Some Variables of the Strategic Profit Model for Three typical Sweetpotato Noodle Wholesalers in Chengdu in 1997.

Variables	Wholesaler 1 (small scale)	Wholesaler 2 (medium scale)	Wholesaler 3 (large scale)
a. Net Sales (yuan)	136,000	238,000	680,000
b. Gross Margin (yuan)	24,000	39,200	120,000
c. Total Expenses (without interest cost)	22,502	26,742	54,506
d. Net Profit = (b - c)	1,498	12,458	65,494
e. Profit Margin = (d / a)	1.10%	5.23 %	9.6 %
When considering the interest cost:			
f. Interest cost (yuan)	186.27	326.4	948.3
g. Net Profit (d – f)	1,311.73	12,131.6	64,545.7
f. Profit margin (g / a)	0.96%	5.09%	9.49%

Net Sales The annual sales volumes of wholesalers vary in different wholesale markets and among different wholesalers. They range between 20 tons and 500 tons per year. The sales quantities of the three chosen wholesalers 1, 2 and 3 are 40, 70 and 200 tons respectively, which represents small, medium and large size wholesalers. Their 'Net Sales' are calculated on the basis of an average wholesale market price of 3.4 yuan per kg. Net sales for wholesalers 1, 2, and 3 are 136,000, 238, 000 and 680,000 yuan respectively.

Gross Margin 'Net Sales' minus 'Cost of Goods Sold' is the 'Gross Margin'. The cost of noodles is the result of purchased noodle prices multiplied by their corresponding noodle volumes. The purchased noodle prices reported by these wholesalers were 2.8, 2.84 and 2.8 yuan per kg for wholesalers 1, 2 and 3 respectively. Therefore, their gross margins are 24,000, 39,200 and 120,000. It is interesting to note that purchasing prices paid by the big wholesalers are not lower than those of other wholesalers. Apparently, the large-scale wholesaler does not have advantage in bargaining power.

Total Expenses The expenses of wholesalers consist of four main components: tax & market fees, transportation fees, storage costs and labour costs. Due to the difficulty for tax officers to obtain each wholesaler's actual sales on a monthly basis, it is not possible to tax wholesalers on the basis of their trade value. Tax offices fix taxes for each storage house according to its capacity. In addition to the tax, wholesalers have to pay different fees every month, including market security fee, cleaning fee, administrative fee, etc. Usually these fees are as high as the amount of tax. In most wholesale markets, the rent, tax and fees for each storage house are fixed per month and collected together. The fixed monthly tax plus

fee, and rent for the storage houses of wholesalers 1, 2 and 3 are 480, 550 and 710 yuan respectively. In addition, all three chosen wholesalers also rent storage rooms (same size) at the noodle collecting area, which cost 30 yuan per month. Therefore, their subtotal expenses from tax & fee and rent cost would be 6,120, 6,960, and 8,880 yuan respectively. Since these costs are fixed, there are economies of scale. Given the three wholesalers' annual trade volume, their fixed costs per ton are 153, 100 and 44 yuan respectively. Apparently, Wholesaler 3 makes the most use of his storage capacity and enjoys the economies of scale.

All three wholesalers rent trucks for transport of noodles. The fee differs according to the transportation distances and the companies from which trucks are hired. The average transportation fee is 0.16, 0.14 and 0.16 yuan per kg noodles for the three wholesalers. The transportation fee for wholesalers 1, 2, and 3 would then be 6,400, 9,800 and 32,000 respectively. Apparently, there are no economies of scale in transportation. The labour costs are calculated according to the average money wage in Sichuan Province: 3,644 yuan for collective owned and 6,338 yuan for private ownership staff (SSB, 1997). 6,338 yuan is chosen as the three wholesalers' wage and 3,644 yuan is used for calculating the labour cost of their three local collectors. In addition, Wholesaler 3 hired one person for help, so another 6,338 yuan will be added on for him. Therefore, their labour costs would be 9,982, 9,982 and 13,626 for respectively. In summary, the total expenses for the three wholesalers add up to 22,502 yuan, 26,742 yuan and 54,506 yuan, respectively. The trade volumes per labourer in the three wholesale companies are 20, 35 and 67 tons respectively. Once again, Wholesaler 3 makes the best use of the labourers while Wholesaler 1 underuses his labour.

Net Profit, Profit Margin 'Net Profit' is the difference between 'Gross Margin' and 'Total Expenses'. As presented in Table 8.3, the three wholesalers have net profits of 1,498; 12,458; and 65,494 yuan each. 'Profit Margin' (the ratio of net profit to net sales) indicates wholesalers' ability to recover the service cost. Wholesalers 1, 2 and 3 enjoy profit margins of 1.1%, 5.23% and 9.6% respectively. Obviously, Wholesaler 3 enjoys the highest profit margin.

Note, we have not yet considered the cost of interest rates in calculating storage costs. The most common way of borrowing money for Chinese people is from their family relatives or close friends. It is a kind of trust and help. Repayment is normally supplemented by gifts instead of interest. Private business applying for loans from commercial banks is just starting, given the more liberalised financial markets. Although the three selected wholesalers do not have debts with the banks, we think that as an economic analysis, it is unfair not to take interest costs into consideration, particularly when wholesalers have certain stock in their warehouses. Therefore, we are going to calculate the three wholesalers' interest costs under two assumptions: the market demands are constant

per time period; wholesalers' interpurchase time is fixed at every two weeks. Of course, these assumptions are not precise in reality, but they are the indications of the importance of storage costs in profit calculation.

The calculation of interest costs starts with the calculation of the wholesalers' stocks. The noodle demand per day is calculated from their yearly sales of 40, 70 and 200 tons respectively based on the assumption of constant demand over 365 days. During a two-week interpurchase period, their total noodle demand is 1.54, 2.66 and 7.84 respectively. These numbers are also wholesalers' order quantity every time. Following the common knowledge, half of the demand amount is their constant stocks in the warehouses. The quantities of these constant stocks multiplied by their purchase prices (2.8, 2.84 and 2.8 yuan/kg) gives the money value wholesalers have to invest on average in the stocks throughout the year. These values are 2,156, 3,777.2 and 10,976 yuan for wholesalers 1, 2 and 3, and these are the amounts used for calculating the interest costs. The annual interest rate for a one year loan from the People's Bank of China (China's central bank) was 8.64% in October, 1997.We then calculate the three wholesalers' interest costs as 186.27, 326.4 and 948.3 yuan (Row f.). Their net profits with interest costs are the results of the amount as calculated in Table 8.3 minus the estimated costs. Therefore, the three wholesalers' net profits are 1,311.73, 12,131.6 and 64,545.7 yuan respectively and consequently, their profit margins are 0.96%, 5.09% and 9.49% respectively.

8.3.2 Discussion

The marketing reforms permit everybody to participate in the marketing process. This policy encouraged the development of the private sector. However, success varies, as we can see in our case studies. It seems that Wholesaler 3 of our case studies has realised economies of scale by increasing turnover. The reasons sees to be that he makes best use of his storage house and enjoys economies of scale given fixed costs such as tax, fee and rents. The large wholesaler also seems to make most efficient use of labour.

In addition to differences of wholesalers in individual operations, variation in market infrastructure may also influence the performance of the three wholesalers discussed. For example, Wholesaler 1 is located in *Hongjilu* Wholesale Market, and his market activities could be constrained by the geographic position of this market. *Hongjilu* market is situated in the centre of Chengdu, and the big trucks can only enter the markets during specific regulated hours. In contrast, *Wukuaishi* market,

where wholesalers 2 and 3 are based, is situated in the suburb of Chengdu City. This market is also more attractive since it is near to the Chengdu railway station.

8.4 The Integration and Co-ordination of Sweetpotato Processors' Activities in the Marketing System

8.4.1 Introduction

In the transition from a centrally planned to a market economy, farmers become more involved in the market process. They experience market risks by growing and supplying products for the market. Chinese sweetpotato farmers have to decide about whether or not to process sweetpotato into noodles and about the choice of marketing channel for their products. Integration of processing activities increases added value for farmers, but requires additional labour and investments.

Are some farmers more integrated into marketing than others? Integration is practised by factors including the extent of integration into sweetpotato processing. Production factors, such as abundant labour, but also added value gained by processing sweetpotato, will influence the degree of integration by farmers. Some processing households integrate into markets by purchasing starch for processing purpose. Farmers can co-ordinate their activities in the noodle marketing system better by strong relationships with wholesalers and by good information about markets, such as price information.

In the following study we intend to analyse which sweetpotato processors are more integrated and better co-ordinated in the market, and which are their characteristics. The sweetpotato processors' data used for this analysis includes the following variables:

buystarc = quantity of starch purchased (*jin*)

noodl96 = noodle production in 1996 (*jin*)

twholesa = often do business with wholesalers (0: no; 1: yes)

fixed = have a long term relationship with traders (0: no; 1: yes)

setprice = number of information sources used for price setting

hlabour = number of household labourers

hages = age of the head of household

hschool = the number of school years of the head of household

region = processors' counties (0: *Santai*, 1: *Anyue*).

Our objective is to find out whether some processors are more integrated in the markets than others and what might be the reasons for the difference. In order to

find out whether differences exist in the degree of market integration/co-ordination, cluster analysis will be applied on the sample of households. Variables being characteristics of market integration/co-ordination are included in the cluster analysis. These are: quantity of starch purchased for processing purpose ('buystarc'), whether do business with wholesalers ('twholesa'), whether have a long term relationship with traders ('fixed'), and the number of information sources used for price setting ('setprice'). Logistic analysis is then used to investigate whether farmers' characteristics and demographic variables can explain the degree of integration/co-ordination.

8.4.2 Classification of Processing Households

Cluster analysis is used to segment the processing households. Since the four selected variables are different in their measurements (interval, counts and binary), they are first standardised into the range of 0 to 1. Squared Euclidean distances are then chosen as the similarity measure and the Single Linkage (Nearest Neighbour) is used as the clustering algorithm to determine which cases are combined at each step. Because we intend to segment sweetpotato processors into two groups (more vs. less market integration), two clusters are specified for the hierarchical cluster analysis[4]. The procedure defined two clusters with 48 and 78 cases respectively.

The means of the four variables on two clusters are presented in Table 8.5. The group means show that the 48 members in Cluster 1 are different from those 78 in Cluster 2. Members in Cluster 1 buy a larger quantity (average of 12,433 *Jin*) of starch than members of Cluster 2 (6,512 *Jin*). In fact, individual households in Sichuan can only produce a few tons of fresh sweetpotato roots given the limited arable land available for each family. If they want to process more sweetpotato noodles, buying raw materials (either fresh root or starch) from the markets is necessary. The alternative is that farmers may subrent other households' land in order to increase sweetpotato production. However, subrenting arable land among farmers is not popular yet due to local regulations and the lack of a legal system (Huang, 1999). As a result, they have to buy input in the starch market.

---

[4] Three-cluster solution is also carried out with 51,35 and 40 members, respectively. However, it is difficult to interpret them and their small memberships also make subsequent analysis problematically. Therefore, we focus on two-cluster solution.

All 48 processors in Cluster 1 have a long term relationship with traders while no processors in Cluster 2 have this. Members in Cluster 1 also tend to look for more information (average 3 sources) for their price formation, and like to do business with wholesalers, when compared with Cluster 2. The results show that the two clusters display different market behaviour, and members in Cluster 1 are more integrated and co-ordinated in the markets than members in Cluster 2. We therefore label Cluster 1 as 'More Market Integrated Processors' (MMIP), and Cluster 2 as 'Less Market Integrated Processor' (LMIP).

Table 8.5 Group Means for Two-group Cluster Solution

Variables	Mean		Standard Deviation	
	Cluster 1	Cluster 2	Cluster 1	Cluster 2
buystarc	12433.54	6512.05	11343.58	10041.62
fixed	1	0	0	0
setprice	2.99	1.78	1.64	.77
twholesa	.83	.45	.38	.50
Cluster Size: Cluster 1 = 48, Cluster 2 = 78, Total valid: 126.				

8.4.3 Characteristics of Processing Households

We understand from the above analysis that processors in the two clusters behave differently. So what are the characteristics of these clusters? Do they relate to demographic characteristics and production size? Consequently, processors' characteristics 'noodl96' and four demographic variables ('region', 'hlabour', 'hschool' and 'hages'), are introduced as explanatory variables for being more or less market integrated (belonging to Cluster 1 or Cluster 2).

A Logistic regression model was chosen to test whether these variables have any significant impact on being more or less market integrated, since Logistical regression can be directly used to estimate the probability of an event occurring. If applied to our model explaining the influence of variables on the degree of integration of sweetpotato processors in the markets, the Logistical regression model can be written as:

$$\text{Prob(MMIP)} = \frac{e^{Z}}{1 + e^{Z}}$$

where $Z = B0 + B_1$ (noodle96) $+ B_2$ (*hlabour*) $+ B_3$ (*hschool*) $+ B_4$ (*hages*) $+ B_5$(region). The dependent variable 'Z' represents the probability of being a more market integrated processor as classified in the cluster analysis (1:MMIP, 0:LMIP). Since the Logistic regression model is non-linear, the parameters are estimated using the maximum-likelihood method instead of the least-squares method, in which the estimators are defined as the value of making the observed results most 'likely' to be selected. The estimation results and model fits are presented in Table 8.6. The logistical regression results show that the –2 log likelihood is 138 and the Goodness of Fit is 125. The Model Chi-Square is significant.

The estimation results show that the coefficient of variable '*region*' is significant at a 1% level. Given the parameter coding of *Anyue* County as 1 and *Santai* as 0, the result indicates that processors in *Anyue* County have a higher probability of being more market integrated than processors in *Santai*. During the fieldwork, it was observed that farmers in *Anyue* tend to specialise in different stages of the marketing channels, such as starch processing, noodle processing, collecting and wholesaling. Under the local government supervision and help, several noodle markets have been established at village and township levels at *Anyue*. Furthermore, a large proportion of wholesalers in *Chengdu* wholesale markets is originally from *Anyue* and they still keep close business contact with *Anyue* processors. Therefore, the well-developed marketing system may stimulate and encourage the development of the sweetpotato processing industry in *Anyue* County towards more market integration.

The variable '*hschool*' (the number of school years of the head of household) is also significant, but at a 10% level only, which suggests that the more educated the farmers are, the higher the probability that they are more market integrated. The coefficients of the variables noodle production, household labour and age of the head of household are not significant. The insignificance of the variable '*hlabour*' indicates that processing activities are not affected by household labour supply. Although the number of household labourers is less than the number required for processing activities due to the decreased family size, there is a rural labour surplus and processing households can easily hire labourers or help each other. The

insignificant coefficient of the variable 'noodl96' indicates that being a large-scale processor does not imply stronger co-ordination/integration in the marketing system.

Table 8.6 The Estimation Results of Logistic Regression

Variable	B	S.E.	Wald	df	Sig
NOODLE96	1.2E-05	2.566E-05	0.2091	1	0.6474
HLABOUR	-0.2217	0.2444	0.8225	1	0.3644
HAGES	-2.8E-05	0.0287	0.0000	1	1.0000
HSCHOOL	0.1205	0.0708	2.8934	1	0.0889
REGION(1)	1.6052	0.5983	7.1990	1	0.0073

Model Fit Assessment:
-2 Log Likelihood   138
Goodness of Fit   125

         Chi-Square df. Significance
Model   26.435   5   0.0001

8.5 Impact of Marketing Activities on Economic Development

In addition to influencing channel performance substantially, a shift towards a market economy will also have strong impacts on social and economic aspects of transitional countries. In fact, Janssen and Van Tilburg (1997) argued that marketing performance assessment in developing countries should include the objectives of economic development, such as the interaction of marketing activities with the economic environment, in terms of employment, income generation, etc.

Two decades of marketing activities in sweetpotato processing have had a strong impact on the economic development of Sichuan's rural economy. Farmers greatly benefit from the market activities of sweetpotato processing. The processors who started early are already becoming the new rich; some of them are actually operating at manufacturing level and hire a large number (20 -100) of long term employees. Box 8.1 presents an example of a sweetpotato processor. We will discuss how sweetpotato processing activities in Sichuan Province create employment opportunities, generate additional income and diversify sweetpotato

usage. These items have been main concerns of the government, due to the rising unemployment and stagnating incomes in rural areas.

Box 8.1 A Sweetpotato Processor

Mr. Zhang, a disabled person, aged 30, lives in Five Sheep Village of Santai county. He has operated the sweetpotato processing activities since 1990 and now hires 6 local labour hands. In 1996, he processed 100 tons of fresh sweetpotato roots and produced about 20 tons of sweetpotato noodles. Fifty percent of his noodles are sold to wholesalers from large cities, such as Chengdu and Mianyong. In order to ensure the water supply, he has drilled a well by borrowing funds from relatives and friends. The problem he is facing now is the shortage of electrical power. Since the community has another collectively-owned manufactory, the power of Mr. Zhang's processing units often has to be cut in order to meet the priority demand for the collective manufactory. Although facing some problems, he is confident about his future as a processor. He has already built a large new house for his family.

8.5.1 Impact on Employment

Unemployment did not exist during the centrally planned economy periods because everybody was assigned a job under the detailed planning. Since the economic reforms, unemployment has become a new phenomenon in China because of the increasing production efficiency and the need for reallocation of labourers during the structural adjustments to the economy. The improvement of agricultural production efficiency has released more rural labourers from agricultural production. Table 8.8 presents changes in the structure of rural labour during the last two decades. As can be seen from this table, there is an increasing shift of rural labourers from the agricultural to the non-agricultural sector. The percentage of rural labour who engage in non-agricultural production increased from 7% in 1978 to almost 30% by the year 1996, and most of them are absorbed by township enterprises (Huang, 1998). Over 50 million rural labourers make Sichuan the largest farm labour province in China. About 6 million rural labourers in Sichuan have already been laid off from agriculture during the last decade, and some 4 million of them are working on a temporary or contract basis, mainly in the southern provinces (RSY, 1997).

Table 8.7 The Structure Changes of China's Rural Labour during the Last Two Decades (million)

Years	Total Rural Labour	Agricultural Labour	Non-agricultural Labour
1978	306.38	284.56 (92.9)*	21.82 (7.1)
1984	359.68	316.85 (88.1)	42.83 (11.9)
1985	370.65	303.52 (81.9)	67.14 (18.1)
1990	420.10	333.36 (79.4)	86.73 (20.6)
1992	438.02	340.37 (77.7)	97.65 (22.3)
1995	450.42	323.35 (71.8)	127.07 (28.2)
1996	452.88	322.60 (71.2)	130.28 (28.8)

* : numbers in the brackets are the percentage.

Source: Huang, J. K., 1999.

Off-farm labourers are migrating to the already crowded cities to look for new jobs. This puts high pressure on urban employment since the reforms of state owned factories have already laid off millions of workers in recent years. In order to prevent the flow of rural labourers to the cities, the government policy is to develop rural enterprises and absorb the rural labour surplus labourers locally. Sweetpotato processing can fulfil the objective and therefore is promoted by Sichuan government. One of the contributions of household processing is the absorption of surplus rural labour.

A large number of farmers started sweetpotato processing immediately after the agricultural reforms. Taking Zhuoli Township in Santai County as an example, Zhuoli has a population of 45,700 with a labour population of 21,800. More than one third of the rural labourers in Zhuoli has moved into the processing industry. It was also found during the field survey that some migrant labourers have returned home to engage in sweetpotato processing, returning from the southern coastal provinces where they tried to find jobs.

So it appears that the integration of sweetpotato households in the markets and the accompanying efficiency improvement create surplus rural labour and bring about unemployment. On the other hand, the market integration also generates new employment opportunities, such as in processing.

8.5.2 Income Generation

Farmers' income experienced a sharp increase immediately after the decollectivisation policy was introduced in the late 1970s. However, once the one-time discrete effect of the Household Responsibility System reform was exhausted, farmers' real income fell or grew only sluggishly in the late 1980s (Lin, 1992). The central governments are seeking new pivots to further increase rural income.

Agricultural processing adds value to crops and is an efficient way of generating additional farmers' income. Sweetpotato roots have a low market price and processing activities bring new opportunities to increase the added value of this crop. Table 8.8 makes an income comparison between processing and non-processing households. Basically, the household incomes in Sichuan Province consist of money from pig raising, grain marketing, off-farm labour, processing and other sources.

As can be seen in Table 8.8, income from sweetpotato processing makes up the majority (84.9%) of processing farmers' total income, while non-processing farmers' income mainly comes from pig feeding and off-farm labour (40.16% and 46.4% respectively). Off-farm labourers mainly work in the coastal region of south China and then remit their savings to their families in Sichuan. Given the 'One Child' policy in China, the average numbers of children in each family is one or two (average 1.27 children per family from our survey) and therefore the difference in household size is not significant (average 3.77 person per family from our survey). The turnover per capita is 1,326 yuan for non-processing households, while that of processing households is more than three times higher (4,530 yuan per capita). Of course, one should bear in mind that the high turnover of processing households is not equal to the amount households can spend. Processors have to deduct additional costs involved, such as investment in machinery, hired labourers and other inputs. However, it is certain that sweetpotato processing is the main contributing source in increasing farmers' income in Sichuan.

Table 8.8 Turnover of Processing and Non-processing Households in Sichuan

Items	Processing households (%)	Non-processing households (%)
Sources of Household Income:		
-- pig raising	9.18	40.16
-- grain	0.65	1.17
-- off-farm labour	1.9	46.4
-- processing sweetpotato	84.9	0
-- others	3.37	12.27
Total	100%	100%
Turnover per capita (yuan)	4530	1326
Sample Size	127	86

Source: Field survey by Author, Spring, 1997.

8.5.3 Diversification of Sweetpotato Utilisation

The utilisation of sweetpotato has changed tremendously in recent decades. Until the 1980s, sweetpotato was a staple food and held an important position in the Sichuan food supply. With economic development, the utilisation of sweetpotato has gradually shifted toward livestock feed and processing activities. More details have already been given in Chapter 3. The situation of sweetpotato utilisation varies considerably between regions and households. The main uses of fresh sweetpotato roots can be grouped as home consumption, sales, feed, waste and processing. Table 8.9 compares the sweetpotato utilisation for two types of households: processing vs. non-processing. The calculation is based the amount of fresh sweetpotato roots harvested from own production, excluding purchase from outside.

As presented in Table 8.9, there is a large difference in sweetpotato utilisation between sweetpotato processing and non-processing households. In particular, the percentage of sweetpotato used for pig feeding in non-processing households is about 8 times higher than that in the processing households. Home consumption of fresh roots in both processing and non-processing households is 7.5% and 17.7% respectively and the figures include the proportion of the harvest reserved for root seeds. This number confirms that sweetpotato is no longer a staple food. The percentages of marketed fresh roots are below 10% for the two kinds of households. Processing households do not market their fresh roots. They may even have to purchase raw material from the markets. The amount of sweetpotatoes marketed by non-processing households is also limited, only 9.5%. Due to the improvement of

storage technology and the processing activities, the amount of waste is much lower (1.49% for processing households and 8.44% for non-processing households) than people's normal estimation of 30% to 50% loss. Furthermore, processing activities alleviate the need for large storage space for fresh roots as we can see from the fact that more than 80% of sweetpotato in processing households is used for processing.

Table 8.9 Utilisation of Sweetpotato Production in both Processing and Non-processing Households in Sichuan

Structure of Sweetpotato Utilisation	Processing Households	Non-processing Households
-- home consumption	7.5%	17.7%
-- sales	0.58%	9.5%
-- pig feed	8.3%	64.66%
-- waste	1.49%	8.44%
-- processing *	82.13%	0%
Total	100%	100%
Sample size (household)	127	86

* : The residue from sweetpotato processing can be continuously used as pig feed or raw material for alcohol producing.
Source: Field Survey by author, Spring, 1997.

One may argue that the large proportion of sweetpotato used for processing may adversely affect Sichuan's pig raising industry. In fact, this is not the case. Sweetpotato processing only extracts starch (around 16% of dry matter) and the remaining residues can still be used as pig feed. From our survey, the average number of pig stock in non-processing households (2.6 head per household) is even smaller than that in processing households (3.4 head). This phenomenon may be explained by the availability of substantial quantities of processed sweetpotato residues in processing households.

8.5.4 Conclusion

The market liberalisation in transitional countries not only stimulates the development of new market outlets and encourages the participation of the private sector in the distribution channels, but has also strong impacts on rural economic development. The impacts of sweetpotato marketing activities on Sichuan's rural economy are significant. The labour-intensive processing activities not only provide a unique opportunity to reallocate the rural surplus labour and to stabilise the society, but also bring significant income for farmers. In addition, processing

activities have also resulted in more efficient use of the sweetpotato resource. The utilisation of sweetpotato shifted from its main functions of human consumption and pig feed to noodle processing, leading also to significant decreases in losses due to wastage.

CHAPTER 9

IMPLICATION OF OUR RESEARCH RESULTS: AN EVALUATION FROM THE MARKET ORIENTATION POINT OF VIEW

9.1 Introduction

'Market orientation' is a leading principle in organising marketing by companies. It might also serve as a guiding concept for transforming marketing in the transition from a centrally planned economy toward a market economy. For agricultural marketing channels, especially vertical marketing systems, market orientation is in particular helpful to organise marketing through the different steps of a market channel. In this chapter, we use this concept as a framework to infer insights and conclusions about marketing planning and marketing organisation of Chinese sweetpotato sector from our research findings. Also, some general conclusions about transforming agricultural marketing in the transition from a centrally planned to a market economy are drawn.

Although there are different definitions of 'market orientation', it is commonly accepted that market oriented organisations have both a customer focus and a co-ordinated marketing operation (Shapiro, 1988; McNamara, 1972). Customer focus refers to the understanding of customers' needs, wants and behaviour. Co-ordinated marketing implies that 'market orientation' touches all aspects of the company, not solely the marketing department of a company. Marketing decisions should be made interfunctionally and interdivisionally. A widely cited definition of market orientation by Kohli and Jaworski (1990) defines market orientation as: 'the organisation-wide generation of market intelligence, pertaining to current and future customer needs, dissemination of intelligence across departments, and organisation-wide responsiveness to it'. In this definition, market orientation is based on three dimensions: a) *generation* of market intelligence, b) *dissemination* of market intelligence and c) *responsiveness* to market intelligence.

Market intelligence is a broad concept and it can include general market information, and characteristics of various market actors. Dissemination is the

communication about market intelligence among different subjects in the organisation, such as formal inter/intra group meetings, circulation of market reports, newsletters, etc. The ultimate aim of generating and disseminating market intelligence is to improve companies' decision making and their performance by responding to the market intelligence. Such responsiveness includes response planning & design activities and response implementing (Grunert, et al. p.186, 1996). We will organise our discussion of the implications of our research results for the whole sweetpotato sector by focusing on intelligence generation and responsiveness while paying some attention to the dissemination process.

9.2 Intelligence Generation from Consumers

Market intelligence not only refers to the information about customers' needs and preferences, but also includes an analysis of environmental factors, such as competition, government regulations, etc., that are relevant to marketing operations. Our research focused first and foremost on the consumers. Its market intelligence can be summarised as follows:

9.2.1 Consumer Perception and Preference

Our empirical work on consumers' needs and wants shows that consumers are misunderstood by producers to a certain extent. The most remarkable information generated from consumers is about packaging and colour.

Consumers' main concern about unpackaged noodles is the product quality, in particular the contamination during transportation to the market. Packaging not only improves hygienic conditions of the food product, but also offers information about product usage, ingredients and shelf life. In more sophisticated marketing operations, packaging is also extremely important in supporting brand and company image. However, packaged noodles can hardly be found in open markets, which are the main market outlets of sweetpotato noodles. Therefore, noodle marketers have to become aware that there is market potential for packaged noodles.

The natural colour of sweetpotato noodles is yellow. A certain technology may be used to change noodles' natural yellow colour into white. As a result, two types of sweetpotato noodles coexist in the markets: yellow colour is the dominant, white is scarcer. Processors are eager to learn how to whiten noodles since they think white noodles are equivalent to high quality products. Therefore, there is an increasing trend

for white noodles in the markets. However, our study shows that consumers value white sweetpotato noodle colour least. Urban consumers prefer yellow colour to white colour. This could be explained by consumers' health concern: mostly noodles are whitened during the processing by adding additives, which are harmful to the human body if added above a certain level. Consumers' perception that white noodles are unhealthy is in particular strongly held by educated urban consumers. The market intelligence about consumers' colour perception should be disseminated to producers and should be responded to by doing less colouring. Channel organisation in the marketing system should suit that purpose. Producers should be informed about consumers' needs, wants and behaviour. They should be adequately organised in order to respond to market signals, such as those about packaging and colour.

9.2.2 Segmentation of Consumers

We have already discussed that urban consumers put a higher value on 'package' than rural consumers. Urban consumers also have a higher variety-seeking tendency, are more quality conscious and less price conscious than rural consumers. Table 9.1 summarises these differences between rural and urban consumers. Market response on the basis of consumer intelligence can be to segment the market into rural and urban consumers. This implies different market strategies for sweetpotato marketers.

Table 9.1 Consumers' Segmentation on Product Attributes

Items	Rural Consumers	Urban Consumers
Packaging required	Fair	Important
Quality consciousness	Fair	High
Variety seeking	Limited	Great
Price consciousness	Low	Competitive

9.2.3 Consumers' Relations with Retailing

The research results show that the main retail outlet of sweetpotato noodles is the open market and even then the product is not always available. Market distance is a significant variable in influencing consumers' noodle consumption. Apparently, ineffective market distribution and unstable product supply at retail level hamper consumers' noodle consumption. Marketing channels should be organised in such a way that retailers can receive information about consumers regularly and respond efficiently to it. The location of retailer outlets should also take consumers' travel distance into consideration. Logistics should be improved to avoid problems of running out of stock.

9.3 Dissemination of and Responsiveness to Market Intelligence

Dissemination of and responsiveness to information involve not only the actors of the marketing system in the narrow sense, such as processors, wholesalers and retailers, but also the supportive organisations, like R&D institutes and the government as presented in the marketing system of Figure 7.1.

The involvement of different actors in the marketing channel of a product varies with respect to market intelligence generation, dissemination and responsiveness. The responsiveness of these actors is related to one or more market mix elements, such as product, price, promotion and distribution. Processors main focus on production and they may be 'price takers' in the markets. Wholesalers and retailers respond to market intelligence, in particular by changing price, promotion and distribution. In a centrally planned economy, government agencies also function in the channel as marketing actors. However, in the transition process, government marketing institutions were either abolished, or have changed their role to support newly established private actors. The role of marketing institutions and government becomes increasingly to facilitate the marketing process by generic policies and to support enterprises with respect to intelligence generation, dissemination and responsiveness.

Response items of potential actors in the channel to our research results are summarised in Table 9.2. The respondents in this table include processors, wholesalers, retailers, R&D institutes, marketing co-operatives and the government agencies. Sweetpotato producers are excluded here since they produce raw material and influence the noodle supplied to consumers only to a limited extent.

Table 9.2 Responsiveness toward Market Intelligence Generated

Actors	Responsiveness toward Market Intelligence
Processors	Colour, packaging
Wholesalers	Standardisation, grading, economics of scale
Retailers	Outlet choice, product availability
R & D institutes	Product development, quality improvement
Market Co-operatives	Market intelligence generation, bargaining power, overhead of R &D, promotion, packaging, etc.
Government agencies	Extension, communication, infrastructure, regulation and laws.

Processors should adjust noodle colour according to the observed consumers' perception and preference. The increasing importance of packaging could jointly be tackled by processors and marketing co-operatives. Wholesalers should respond by improving efficiency and effectiveness of noodle marketing, such as by benefiting from economies of scale by concentration, and by improving the use of labour and storage capacity. Wholesalers are best placed to standardise and grade product supply due to the product accumulation at this stage. A well-established sorting and grading system could also improve returns for high quality products to wholesalers. There is a potential opportunity for new retail outlets, since lack of product availability and long market distance are negatively influencing consumers' noodle consumption. Logistics should also be improved to keep a stable product supply at retail level. Product innovation and quality improvement could be done not only by processors. Basic inventions, such as developing new sweetpotato varieties, are too expensive for individual farmers and have to be performed by government R&D.

In conventional marketing channels, organisation of responses in the channel will be co-ordinated by market prices. In a vertical marketing system, these responses are co-ordinated by agreements. For that reason, creating market transparency seems the first stage toward effective responsiveness of channel actors in the transformation from a centrally planned economy toward a market economy. Further refinement in market response, such as with respect to packaging and colour, might require a market response based on co-ordination by other means, such as contract. Also specific marketing institutions might be instrumental in the co-ordination of responses in the marketing channel. Co-operatives are a case in point.

Due to the high expectations and the limited responsiveness of marketing co-operatives and government, we will discuss them separately.

9.3.1 Marketing Co-operatives
Millions of sweetpotato processing households form the backbone of sweetpotato processing. However, the huge number of small processors makes the information dissemination to these processors and their responsiveness to market information troublesome. Individual households also have weak bargaining power. As a result, farmers' co-operatives might be a device to improve the market orientation and bargaining power of farmers/processors. A type of co-operative called 'Sweetpotato Noodle Association' has already appeared at township level in Sichuan. This

association tries to represent the individual processors collectively. However, their operations are more production oriented than marketing oriented. This problem of production orientation is faced by many co-operatives, also in western countries (e.g. LeVay, 1983; Meulenberg, 1996).

The tasks of marketing co-operatives for sweetpotato noodles would be aimed at strengthening individual processors' marketing power and providing marketing services. They would gain from co-ordination among the market actors, reducing market risk, and finally become more market oriented by effectively responding to the marketing intelligence. In order to avoid the appearance of another rigid, bureaucratic institution as in the past, additional advice for the establishment of marketing co-operatives in real terms (as self-help democratic organisations) is needed.

Intelligence collecting and disseminating: The functions of information collecting and gathering are not carried out systematically in the current market system. Market actors seek information individually and incidentally, and their decision-making is mainly based on their own estimation and the limited information available. Since information flows play an important role in the marketing system and individual processors have difficulty in collecting marketing information, marketing co-operatives could process market intelligence from both national/regional agencies and individual companies, as well as disseminate this information to their members.

Responsiveness: Farmers could be either very closely or loosely connected to the co-operatives, based on the principle of a voluntary basis. Co-operative members have to deliver their processed noodles to the co-operative company. The co-operative could have different strategic business units (Meulenberg, 1996), such as units selling noodles to supermarkets and units selling to independent wholesalers or small retailers. Efficient and effective co-ordination should be based on marketing intelligence and dissemination of market intelligence. Their responsiveness would be reflected in the services offered to their co-operative members, which can be grouped as technical support and marketing services.

Technical Support: Both processing and trading require professional training. Processing farmers are interested in improving their noodle quality, but there is insufficient training available. Most farmers learn how to make noodles from each other. Technical training on quality improvement is essential. Co-operatives can jointly do the job with R & D teams; for instance organising demonstration courses on how to improve noodle elasticity. Processing technology training is also necessary in

non- processing regions of Sichuan Province to help sweetpotato producers to start up their processing activities. Training for trading knowledge, particularly for large processors, should focus on bookkeeping, accounting and profit calculations.

Marketing Service: Since individual farmers hold weak bargaining positions in the markets, co-operatives can act as farmers' marketing agencies and vertically integrate farmers into the food marketing channels. Co-operatives can offer different market services to their members. The common issues, such as packaging and branding, could be carried out under the umbrella of co-operatives. An individual processor does not have the ability, and it is also not sufficiently worthwhile for them to promote their products individually. Generic promotion for product image improvement may also be done collectively by the marketing co-operatives. Their market power could be enhanced by the establishment of consumer loyalty toward the brand or image. The co-operatives can not only assure a market for the product, but also reduce the risk by stabilising market prices to a certain extent.

Co-operatives have their advantages over individual farmers in marketing products. The problems are whether farmers are willing to participate and whether they are willing to pay for the services offered. It also remains to be seen whether the old style of co-operatives operated during the central planning periods have left negative image on farmers. However, the new development of co-operatives in recent years is promising. Self-help voluntary based marketing co-operatives have already appeared in some regions. Farmers are showing their interest in participation, particularly in the areas where economic activities are more developed. Taking the fruit and vegetable production in Shandong Province as an example, marketing co-operatives in this area are growing and have recently become popular.

9.3.2 The Role of Government

Intelligence generation and dissemination: In the past, the government was the main player in the noodle marketing game. Since the transition, the government has gradually retreated from direct involvement in the market. The new task of the government should be to define the rules of the game and facilitate of other marketers in the channel in playing the game. Following the traditional classification about market functions of exchange (physical and facilitating), marketing information is one of the central facilitating functions to which the government should pay more attention, particularly in collecting and making market data available to producers and

consumers. Although government related public sectors dominated in the agricultural extension system (Umali and Schwartz, 1994), the traditional agricultural extension in China focused mainly on technology related delivery, while market information was hardly supplied. A well-established communication network should be a basis for ensuring an efficient dissemination of market intelligence, and smooth the information flow at different levels.

Responsiveness: The government's response to market intelligence could be reflected in adapting infrastructure to the marketing needs of this sweetpotato/noodle sector. At present, the performance of physical functions (transportation and processing) is hampered by the poor infrastructure in Sichuan Province. It includes shortage of electric power, difficulty of access to clean water, poor transportation roads, inefficient telecommunication, and so on. The shutdown of power constrains noodle production; unclean water affects noodle quality. Poor road conditions and communication systems increase cost of noodle production and marketing. Much of the required infrastructure works may be done collectively, and government support and internal or external investment are necessary. Chinese farmers have a very good tradition in implementing large collective projects (such as reservoirs) originating from the collective periods.

Defining the rules of the game is another urgent issue for the government, particularly where the facilitating functions of standardisation and grading are concerned. Regulations on product standardisation and grading should be introduced and effectively implemented. A clearly defined grading system is a necessary condition for a higher price of better quality noodles. The grading-criteria could include such items as noodle moisture content, additive residues, noodle colour, smoothness and viscosity. Given consumers' health and security concerns regarding food consumption, sanitary regulations for the sweetpotato processing industry are urgently needed with reference to additive residuals and moisture content.

9.4 General Remarks on Agricultural Marketing in Transition

From our research, we strongly feel that two marketing issues should be considered carefully during the transitional period from a centrally planned economy toward a market-driven economy. One is the setting up of new market institutions, and the other is taking into account the consumers' role in the markets.

Market Institutions

Commercial market institutions do not exist in a command economy. The government agencies, such as the Grain Bureau and Supply & Marketing co-operatives, monopolised and controlled the agricultural supply and distribution system. They were the legal procurement agencies for the main agricultural products. Farmers had to deliver their products to assigned government stations. The product flows in the marketing channels were parallel to different administrative levels (national, provincial, city/county). From the agricultural input distribution to food trade, no private sectors were allowed.

   After market liberalisation, the old system shrunk. The disappearance of the government institutions left a vacuum in the markets. New market organisations may be required to be set up to play the game and new rules have to be defined on how to play the games. Marketing institutions, such as Marketing Co-operatives, Auctions and Futures markets, might take over and play a central role in the new agricultural marketing system. Such commercial marketing institutions should be operated independently and act in conformity with consumers' needs and wants. Private wholesalers can also play an important role in the markets, but they need new rules on how to play the game in order to contribute most to effectiveness and efficiency and equity of the whole market system. This refers in particular to market transparency, market information and grading/sorting. New marketing institutions have already appeared in transitional countries, such as Futures markets, but they often do not operate very well. The reasons for the malfunction of these marketing institutions in transitional countries may include: a) the lack of knowledgeable personnel, and b) continuous government intervention.

Neglected Consumer

Under the old regime, consumers' needs, wants and preference were hardly considered. Ensuring a stable food supply at low price for consumers was the government's priority. In a market oriented system, consumers' needs, preferences and their choice behaviour become of paramount important for marketing policies. However, consumers' needs and wants still seem to be neglected during the transition periods, because consumers were not taken into account before. The role of consumers as the driving force in the markets will have to be recognised as a basic new concept in a transitional economy. It will be understood only fully as marketing competition becomes intense.

APPENDIX 1

INDUSTRY MARKET

1. The Chinese Starch Industry

1.1 Native Starch[5]

China's starch industry has expanded substantially during the last decade. Starch produced in China originates from maize, cassava, potato, sweetpotato and wheat. According to the Second General Survey conducted by the Chinese Association of Starch Industry in 1995, the total number of enterprises in the starch industry has doubled from 300 to over 600 since 1989. Native starch production reached an annual figure of 2.5 million tons in 1996. The summary table regarding this survey is presented in Table 1. It does not cover the entire starch industry in China. However, major starch factories are included. According to the estimation from Chinese Association of Starch Industry, the production of these factories accounts for 90% of total starch industry production in China. Therefore this table does offer basic information about the structure of China's starch industry.

As presented in Table 1, maize starch dominates China's starch market and accounts for 84% of the total starch production. The main maize production provinces are in the north of China, such as Jiling, Sandong and Henan, which are also the major maize starch producing areas. Cassava starch ranks second in importance (11%) and is mainly produced in the two southern provinces, Guangxi and Guangdong. The remaining starch types (potato, sweetpotato, wheat and others) only account for about 5% of the total production. The 10 thousand tons of potato starch (0.4%) are mainly produced in the regions of Inner Mongolia, Heilongjiong and Lingxia. The 60 thousand tons of sweetpotato starch production (2.4%) come from Beijing, Jiongshu, Shandong and Henan province. Obviously, the sweetpotato starch processed by

---

[5] Starch extracted directly from the organs of plants is native starch. All starch used for noodle production in our research is native starch. Starches are often modified using different methods to change their properties in order to meet special objectives of various industries. The processed starch is then called 'modified starch'.

millions of households in Sichuan Province is not included in this calculation. The potato starch produced in Sichuan is also not taken into account. Therefore, the real starch production in China surpasses the indicated 2.5 million tons. Other raw materials besides wheat, such as *Yuzi*, *Shouwu* and *Mouyu*, produced another 2.5% of the total starch production according to this table.

1.2 Modified Starch and Derived Starch Products

Native starch is often modified in order to meet different industrial requirements. Methods of starch modification include physical-chemical modification, chemical modification and enzymatic modification. The objectives of starch modification are to reduce the viscosity, or improve viscosity stability, etc. (Oates, 1997). Native starch, modified starch and products derived from starch are presented in Table 2. The 59,834 tons of modified starch in China were produced by 34 factories. The production of crystallised glucose was 198,818 tons and of liquid glucose 138,289 tons. Modified starch and glucose are widely used in papermaking, adhesives, and the pharmaceutical industry.

2. Starch Industry in Sichuan Province:

2.1 Producers
There are about 50 starch factories in Sichuan province, and around half of them are about to shut down due to their unprofitability. In fact, around 10 of them were already closed during the last five years. The total starch production in Sichuan was 223,177 tons in 1995 according to provincial statistics. Around 60% of this is sweetpotato starch produced by individual households for noodle making, and the other 40% is starch produced by industrial factories. The top 12 starch manufactories in Sichuan Province are listed in Table 3 and none of them produces sweetpotato starch. As can be seen, three of them have a starch production of over 10 thousand tons per year, while others operate at a small-scale level.

   The main industrial starch produced in Sichuan is maize starch. Although Sichuan produces 6.6 million tons of maize every year, due to its higher demand for maize as animal feed, Sichuan still has to import another 3 million tons of maize from other provinces, mainly from Jiling province. Sichuan not only imports maize from the

160

north, but it also imports maize starch. In recent years, starch factories in Jiling province have adopted world-level advanced processing technology and expanded their processing scale. Their good quality, cheap starch has had significant impact on Sichuan's starch markets, and directly led to the close-down of a number of small and medium size starch factories in Sichuan.

During the author's survey, a few factories admitted that they produced sweetpotato starch before the 1980s. Taking Neijiong Pharmaceutical Factory (NPF) as an example, this factory produced and used sweetpotato starch as early as 1958. As a pharmaceutical factory, they use part of their starch produced to make medicine like glucose, and they also sell the rest of their starch in the market. The last time that they produced sweetpotato starch was in the year 1978, the time when the Chinese economic reforms started. Before the economic reform, as a state-owned factory, NPF had to follow the government planning which included input supply, output distribution, etc. During the command economy period, farmers nearby had to deliver their sweetpotatoes at a low price to NPF as part of the compulsory grain quota. NPF then produced sweetpotato starch and sold this to other state-owned manufactories at government fixed prices. However, after the reform in 1978, NPF became responsible for its own raw material supply and product marketing. The rising cost of sweetpotato starch and its lagging processing technology forced NPF to switch to the production of maize starch.

2.2 Users

Compared to the starch producers, it is more difficult to find out which industries are using starch. Starch can be used in a very wide variety of sectors, ranging from the most common user, the food industry, the pharmaceutical industry, papermaking, textiles, to the building industry, mining operations, etc. A big effort was made by the author to investigate the starch use industry in Sichuan (details in Chapter 4). In the end, a survey was conducted among 15 factories, which include 8 pharmaceutical manufacturers, 6 food factories and 1 papermaking factory. The use of starch and the final products for each factory are also listed in Table 4. Starch is mainly used as a raw material to produce medical tablets in the pharmaceutical industry, ice cream and biscuits in the food industry. There is a large variation in starch use among manufactories. The largest volume of starch use is over 300 tons per year, with only a few tons for small users. Although the trend differs for each factory, starch use has

been increasing over the last 15 years, since the average starch consumption for each factory was 39 tons in 1985, 44 tons in 1990 and 47 tons in 1996.

Table 5 shows the varieties of starch used by different factories and their starch property requirements. Except for two out of 15 factories, which used sweetpotato starch and cassava starch, the rest use maize starch as their raw material. In the pharmaceutical industry, the Chinese Ministry of Public Health defines the criteria for starch used as a raw material. Although different factories have their own criteria for starch based on the requirements for their final products, the factories normally prefer starch of pure white colour, with no unusual smell, no dots, etc. The detailed statement can be found in Table 5.

3. Development Trend in the Future

The starch industry is expected to have a bright future in China if the Chinese economy keeps growing. In addition to the industries discussed, starch has also been widely used in the fermentation industry in China, whose products include monosodium glutamate, citric acid, enzyme and starch sugar. With the rising standard of living, the demand for these products will increase.

Starch production will continue to rise, but the marketing structure and the production pattern will also change rapidly in the next decades. The main changes will be concentrated in the following two aspects: Firstly, Starch factories will operate at large scale level. A large proportion of small and medium size starch industries will be shut down due to inefficiency. The factories that remain will be large-scale ones with high level processing technology and world-level equipment. These manufacturers produce top quality starch at a low price due to their economies of scale advantage. In fact, the number of large scale starch producers (more than 10,000 tons annually) in China has increased from 16 in 1989 to 61 in 1996 according to the Chinese Association of Starch Industry. Secondly, the demand for modified starch will continue to grow, thus making it the most profitable industry. However, the demand for *native starch* will mature and stabilise. The rising demand for modified starch will come primarily from the papermaking and food industries. Currently, only a few tons of modified starch is used in the papermaking industry for premium paper production in China. However, with the rising demand for high quality printing paper and packaging paper, modified starch will have a broad market. Another appealing

use of modified starch is in the food industry. Compared with native starch, modified starch can improve product taste and shelf life. Modified starch is used in instant noodles, bakery food, beverages, etc. The markets for these foods are rising, as is the market for modified starch.

Table 1. The Structure of China's Starch Industry[6]

Regions	Starch	Production	(tons)			Number of manufacturers	Total Production (tons)
	Maize	Cassava	Potato	Sweetpotato	Wheat and others		
Beijing	17,740			852		3	18,592
Tianjin	42,056					4	42,056
Hebei	297,972					30	297,972
Sanxi	19,760					5	19,760
Inner Mongolia	20,503		1,082			6	21,585
Liaoning	108,981				1,000	24	109,981
Jiling	369,439					19	369,439
Heilongjiong	66,010		1,128			5	67,138
Shanghai	33,478				24,417	7	57,895
Jiongshu	81,157			5,100	8,165+ 45	21	94,467
Zhejiong	26,713				4,140	6	30,853
Anhui	28,297					9	28,297
Fujiang	1,009	540				2	1,549
Jiongxi	2,235					1	2,235
Shandong	391,698			54,167		32	445,865
Henan	341,099				20,000	27	361,099
Sichuan	92,390				214	21	92,604
Guizhuo	78					1	78
Yunnan	1,411	1,893				2	3304
Shanxi	42,882					10	42,882
Ganshu	28,318					6	28,318
Lingxia	1,185		8,256			4	9,441
Xinjiong	7,551					4	7,551
Guangdong		104,652				18	104,652
Guangxi		164,795				50	164,795
Hainan		1,852				1	1,852
Total	2,063,035	273,733	10,466	60,358	62,503	332	2,470,096
%	83.5	11.1	0.4	2.4	2.5	-	100

Source: Chinese Association of Starch Industry, 1996.

---

[6] Table 1 and Table 2 cover major large starch manufactories in China.

Table 2. The Production of Starch and Its Derived Products in China

Names of Products	Number of Factories	Production (tons)
1. Native Starch, including:	332	2,470,096
-- maize starch	232	2,063,035
-- cassava starch	71	273,733
-- potato starch	5	10,466
-- sweetpotato starch	7	60,358
-- wheat starch	13	61,224
-- other starch	4	1,279
2. Modified starch	34	59,834
3. Crystallised Glucose, including:	71	198,818
-- injection sugar	37	61,204
-- drinkable syrup	64	96,463
4. Liquid Glucose	36	138,289
Total	473	2,867,039

Source: calculated from the data of Chinese Association of Starch Industry, 1996.

Table 3. The Top 12 Starch Producers in Sichuan Province* (tons)

Rank	Factory Name	Location	Production
1	Sichuan Qionglai Starch Factory	Qionglai city	15,000
2	Chuanbei Starch Company	Jiangou county	10,000
3	Lingshui Starch Factory	Lingshui county	10,000
4	Chengdu Huaxi Starch Factory	Chengdu city	8,000
5	Chengdu Starch Factory	Chengdu city	6,300
6	Grain Bureau Starch Factory	Tianchun county	5,000
7	Food Starch Factory	Qu county	5,000
8	Chuannan Starch Factory	Zhigong city	5,000
9	Sichuan Baoning Pharmaceutical Factory	Baoning county	3,500
10	Qionglai Fabric Printing Factory	Qionglai city	3,000
11	Jianyong Youzhi Feed Factory	Jianyong city	3,000
12	Shouhong Modified Starch Factory	Shouhong county	3,000
Total			76,800

* : It does not include Chongqing City.   Source: Sichuan Statistics Bureau. 1996.

Table 4. Fifteen Surveyed Starch-using Factories in Sichuan Province

Code	Factory Names	Starch Used (tons per year)			Products
		1985	1990	1996	
01	Anyue Pharmaceutical Factory	N.A.	90	396	Dextrin
02	Pharmaceutical Factory of Chengdu Chinese-medicine College	1	1	1	Chinese Medicine
03	Chengdu Pharmaceutical Company Limited	70	100	120	Tablets
04	Chengdu Chinese-medicine Pharmaceutical Factory	8	3	2	Tablets, etc
05	Sichuan Pharmaceutical Company	9.44	12.5	20.5	Tetracycline
06	Chengdu No. 4 Pharmaceutical Factory	6	4	3	Kanamycin
07	Neijiong Zhitonggong Pharmaceutical Factory	1	1	8	Tablets, etc.
08	Neijiong Chongzhen Pharmaceutical Company	No	5	8	Tablets, Chinese Medicine, etc.
09	Chengdu Wufeng Food Company	No	No	11	Ice cream
10	Chengdu Xinshanghai Food Factory	8	80	36	Ice cream, sugar, biscuit
11	Chengdu Tin Food Factory	350	300	80	Pork luncheon meat
12	Neijiong Liongyu Food Factory	1	1.5	3	Bread, biscuit
13	Neijiong Cold Drinking Factory	2	2	3	Ice cream
14	Anyue Yiluo Food Factory	8	10	12	Noodles
15	Chengdu No. 4 Papermaking Factory	4	5	7	Paper, cardboard
Average		39.04	43.9	47.3	

N.A.: Not available

Source: Field survey by author, summer 1997.

Table 5.   Starch Property Requirements of the 15 Surveyed Factories in Sichuan
Province

Code	Type of Starch Used			Starch Property Requirements
	1980	1990	1996	
01	Maize	Maize	Maize	White colour, high clarity.
02	Maize	Maize	Maize	Following the criteria set by Chinese Pharmacopoeia.
03	Maize	Maize	Maize	No unusual smell, pure white, no dot, no pellet.
04	Maize	Maize	Maize	No acidity, low ash content, no dot, no pellet.
05	Maize	Maize	Maize	Following the criteria set by Chinese Pharmacopoeia.
06	Maize	Maize	Maize	Low impurity, low water content.
07	Maize	Maize	Maize	No dot, pure white, homogeneous pellets, following the Chinese Pharmacopoeia.
08	Maize	Maize	Maize	All items (colour, viscosity, dot, and pellet) have to follow the pharmacopoeia.
09	Maize	Maize	Maize	Keeping the natural taste of maize starch and its white with slight brown colour.
10	Maize	Maize	Maize	Low lipid, pellet size above 150 *mou*.
11	Maize	Maize	Maize	No unusual smell, pure white, protein content at 0.29%
12	Maize	Maize	Maize	All properties are important.
13	Maize	Maize	Maize	No sediment, no pellet after stirring, and medium viscosity.
14	*Sweet potato*	*Sweet potato*	*Sweet potato*	White with slight brown, ash content below 1%.
15	Maize	Maize	*Cassava*	High whiteness, high clarity, lower in ash, protein, lipid and dot.

Source: Field survey by author, summer 1997.

REFERENCES

Ashton, B. Hill, K. Piazza, A, and Zeitz, R. (1984). 'Famine in China: 1958-61.' *Population and Development Review* 10. No.4. December:613-45.

Assael, H.(1987). *Consumer Behaviour and Marketing Action*, 3rd eds., Boston: PWS-Kent.

Ajzen, I.(1985). 'From Intentions to Actions: A theory of Planned Behaviour,' in Kuhl J. and Beckmann J. (eds), *Action Control: From Cognition to Behaviour* (pp.11-39). New York: Springer Verlag.

Ajzen, I. and Fishbein, M. (eds.). (1980). *Understanding Attitudes and Predicting Social Behavior.* Englewood Cliffs, NJ: Printice-Hall, Inc.

Barzel, Y., (1989). *Economic Analysis of Property Rights*, Cambridge University Press.

Baugartner, H. and Steenkamp, J-B. E.M.(1996). 'Exploratory Consumer Buying Behaviour: Conceptualisation and Measurement.' *International Journal of Research in Marketing*, 13, pp.121-137.

Bearden, W.O., and Etzel,M.J.(1982). 'Reference Group Influence on Product and Brand Purchase Decisions.' *Journal of Consumer Research*, 9 (September), 183-194.

Bonoma, Thomas V., and Clark, B. H.(1988). *Marketing Performance Assessment.* Harvard Business School Press.

Bucklin, L.P. (1970). 'The Classification of Channel Structures.' In: *Vertical Marketing Systems.* Bucklin, L.P. (ed.). Scott, Foresman and Company.

Cai, Z.W., et al.(1990). *Section of Agricultural Economy, Chinese Encyclopedia of Agriculture.* Chinese Agricultural Press, Beijing, China.

Candel, M.J.J.M. and J.C.M. van Trijp (1996). *Selected Topics Consumer Behaviour.* Wageningen Agricultural University, The Netherlands.

Cattin, P., and Wittink, D. R.(1982). 'Commercial Use of Conjoint Analysis: A Survey.' *Journal of Marketing*, Vol. 46 (Summer), 44-53.

Carter, C.A. (1997). 'The Urban-Rural Income Gap in China: Implication for Global Food Markets.' *American Journal of Agricultural Economics*, 79 (Number 5): 1410-1418.

Chai, J.C.H. (1997). *China: Transition to a Market Economy*, Clarendon Press, Oxford.

China Statistical Yearbook (CSY), 1997. Chinese Statistical Publishing House, Beijing, China, 1997.

China Yearbook of Agriculture (CYA), 1984, 1985 and 1997. China Statistical Publishing House, Beijing.

Churchill, G. A.(1995). *Marketing Research Methodological Foundations*, 6th ed. The Dryden Press.

CIAD, (1995). *Potential For Market Diversification of Sweetpotato Starch and Flour in Sichuan Province.* Chinese Agricultural University, Beijing, China.

CIAD, (1995). *Social and Economic Assessment of the Small Scale, Sweetpotato Based Pig Production System in Suining Municipality, Sichuan Province.* Chinese Agricultural University, Beijing, China.

Cubbin, J. S.(1988). *Marketing Structure and Performance – The Empirical Research.* Harwood Academic Publishers.

Davis, L. E., and North, D.C.(1971). *Institutional Change and American Economic Growth*, Cambridge University Press.

Deaton, A. and Muellbauer, J. (1980). *Economics and Consumer Behavior.* Cambridge: Cambridge University Press.

Deng, Y.M., Chen, J.S. and Yuan, Y. K.(1993). *Grain flow: market operation and state regulation.* Economy and Management Press, Beijing, China.

Dijkstra, T.(1997). *Horticultural Marketing Channels in Kenya: Structure and Development.* Dissertation, Wageningen Agricultural University, The Netherlands.

Douglas, S. P., Craig, C.S.(1983). *International Marketing Research.* Prentice-Hall, Inc.

Ellis, F. (1992). *Agricultural Policies in Developing Countries*, Cambridge University Press.

Engel, J.F., Blackwell, R.D. and Miniard, P.W.(1995). *Consumer Behaviour.* 8th ed. The Dryden Press. Harcourt Brace College Publishers.

Engel, J.F., Kollat, D.T., and Blackwell, R.D. (1978). *Consumer Behaviour.* 3rd. ed. The Dryden Press, Holt, Rinehart and Winston, Inc.

Fan, S.(1991). 'Effects of Technological Change and Institutional Reform on Production Growth in Chinese Agriculture.' *American Journal of Agricultural Economics* 73 (May) 266-75.

Ferguson, P.R., and Ferguson, G. J., (1988). *Industrial Economics: Issues and Perspectives.* 2nd ed. The MacMillan Press Ltd.

Furubotn, E. G., and Richter, R.(1991). 'The New Institutional Economics: An Assessment.' In: Furubotn, Eirik G., and Richter, R. (eds), *The New Institutional Economics*, College Station, TX: Texas A&M press.

Fishbein , M.A. and Ajzen, I., (1975). *Belief, Attitude, Intention and Behaviour: an Introduction to Theory and Research*, Reading MA: Addison-Wesley.

Frederick E. W., (1991). *Industrial Marketing Strategy*, 3rd ed. John Wiley & Sons, Inc.

Gitomer, C.S. (1996). *Potato and Sweetpotato in China: Systems, Constraints, and Potential.* International Potato Center (CIP), Lima, Peru.

Goldberg, R.A. (1968). *Agribusiness Coordination.* Harvard University, Boston. USA.

Goossens, F. (1994). *Performance of Cassava Marketing in Zaire.* Dissertation. Katholieke University, Leuven, Beilgium.

Green, P. E. and Srinivassan V.(1978). 'Conjoint Analysis in Consumer Research: Issues and Outlook,' *Journal of Consumer Research.* Vol. 5, September.

------- and -------, (1990). 'Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice,' *Journal of Marketing,* October.

-------- and Wind, Y.(1975). *New Way to Measure Consumers' Judgements.* Harvard Business Review, 53 July-August, 107-17.

Folsom, R. H., and Minan, J.H.(eds.). (1989), *Law in the People's Republic of China: commentary, reading and materials.* Martinus Nijhoff Publishers.

Grunert, K. G.(1988), 'Research in consumer behaviour: Beyond attitudes and decision-making.' *European Research*, August 1988, 172-183.

Grunert, K.G., Baadsgaard,A., Larsen, H.H. and Madsen, T.K. (1996). *Market Orientation in Food and Agriculture.* Kluwer Academic Publishers.

Grunert, S.C., and Juhl, H.J.(1995). 'Values, Environmental Attitudes, and Buying of Organic Foods.' *Journal of Economic Psychology* 16, 39-62.

Haas, R.W.(1989). *Industrial Marketing Management: Text and Cases.* 4th ed. PWS-KENT Publishing Company.

Hair, J.F., Anderson, R.E., Tatham,R.L. and Black,W.C.(1995). *Multivariate Data Analysis,* 4th ed. Prentice Hall, Englewood Cliffs, NJ.

Harriss, J., Hunter, J. and Lewis, C.M., (1995) *The New Institutional Economics and the Third World Development.* London: Routledge..

Hoyer, W.D., and Ridgway, N.M.(1984). 'Variety Seeking as an Explanation for Exploratory Purchase Behaviour: A Theoretical Model.' *Advances in Consumer Research,* Vol.11.

Huang, J. K. and David C. C. (1994). *Policy Reform and Agricultural Incentives in China: A Report to FAO-Beijing.*

Huang, J.K. and Rozelle, S. (1996). 'Technological Change: Rediscovering the Engine of Productivity Growth in China's Rural Economy.' *Journal of Development Economics* 49(May):337-69.

Huang, J.K. (1999). 'Allocation Efficiency of Agricultural Resource in the 20-Year Reform.' *China' Rural Survey* No. 1(p.1-9) and No. 2(29-37).

Hutt, M.D., and Speh, T. W.(1985). *Business Marketing Management.* 3rd ed. The Dryden Press, International Edition.

Jaccard, J. and Wood, G.(1986). 'An Idiothetic Analysis of Attitude-Behaviour Models.' In R. J. Lutz (ed.), *Advances in Consumer Research*, vol. 13, pp.600-5.

Jain, S. C.(1997). *Marketing Planning & Strategy.* 5th ed., South-Western Publishing Co., Ohio.

Janssen, W. G.(1986). *Market Impact on Cassava's Development Potential in the Atlantic Coast Region of Colombia.* Dissertation, Wageningen Agricultural University, The Netherlands.

Janssen, W.G. and Van Tilburg, A.(1997). 'Marketing Analysis for Agricultural Development: Suggestions for a New Research Agenda.' In: Wierenga, B., Tilburg, A.V., Grunert, K., Steenkamp, J.-B.E.M., and Wedel, M. (eds.), *Agricultural Marketing and Consumer Behaviour in a Changing World,* Boston: Kluwer Academic Publishers.

Jaworski, B.J. and Kohli, A.K.(1993). 'Market Orientation: Antecedents and Consequences.' *Journal of Marketing.* Vol. 57 (July), 53-70.

Jiang, L., Rozelle, S., and Huang, J.K.(1994). *Sweetpotato Economy of Zhejiang, Jiangsu and Sichuan Province: a report to CIP.*

Jiang, L. Y., Rozelle, S. and Huang, J.K.(1994). *Production, Technology and Post-Harvest Processing of Sweetpotatoes in Sichuan Province: a report to CIP.*

Joachimsthaler, E.A., and Lastovicka, J.L.(1984). 'Optimal Stimulation Level -- Exploratory Behaviour Models.' *Journal of Consumer Research*, vol. 11. Dec.

Joskow, Paul L.(1995). 'The New Institutional Economics: Alternative Approaches.' *Journal of Institutional and Theoretical Economics*, 151/1.

Kaynal, E. (1984). 'Marketing-Research Techniques and Approaches for LDCs.' In G.S. Kindra (ed.), *Marketing in Developing Countries.* Croom Helm Ltd., U.K.

Ke, B.S.(1995). *China Grain Markets and Policy.* China Agricultural Press, Beijing.

Kinsey, J.(1988). *Marketing in Developing Country.* MacMillan Education Ltd., U.K.

170

Kirchner, C.(1995). 'Market Organisation: A New-Institutional Perspective.' *Journal of Institutional and Theoretical Economics*, 151/1, 260-267.

Kirsch, O.C., Worz, J.G.F., and Engel, J.(1994). *Agrarian Reform in China: Back to the Family Responsibility System.* Verl fur Entwicklungspolitik Breitenbach, Germany.

Kohli, A.K. and Jaworski, B.J. (1990). 'Market Orientation: The Construct, Research Propositions, and Managerial Implications.' *Journal of Marketing*, Vol. 54 (April), 1-18.

Kohls, R. and Uhl, J.N.(1998). *Marketing of Agricultural Products.* 8th ed. Upper Saddle River, NJ: Prentice Hall. Inc.

Kohls, R. and Uhl, J.N.(1980). *Marketing of Agricultural Products.* 5th ed. MacMillan Publishing Go., Inc.

Kolter, P.(1997). *Marketing Management: Analysis, Planning, Implementation and Control*, 9th ed. Prentice-Hall, Inc.

Kolter, P. (1986). *Principles of Marketing.* 3rd ed., Prentice-Hall, Engelwood Cliffs, N.J..

Kool, M.,(1994). *Buying Behaviour of Farmers.* Dissertation, Wageningen Agricultural University, The Netherlands.

Lawrence, S. (1998). 'Unfinished Business.' *Far Eastern Economic Review*, Dec.17, p.22.

Lawrence, S. (1999). 'Answer to a Prayer.' *Far Eastern Economic Review*, Feb. 25, p.50.

Lehmann, D.R., Gupta, Sunil. and Steckel, J.H.(1998). *Marketing Research.* Addison-Wesley Educational Publishers Inc.

Lerman, Z.(1995). 'New Style of Agricultural Co-operatives in the Formal Soviet Union,' Working Paper No. 9506, Department of Agricultural Economics and Management, The Hebrew University of Jerusalem, Israel.

LeVay, C.(1983). 'Agricultural Co-operative Theory: A Review.' *Journal of Agricultural Economics,* vol. 34, no.1, p.1-44.

Lilien, G.L., Kotler, P., and Moorthy, K.S.(1992). *Marketing Models.* Prentice-Hall, Inc.

Lin, J.Y.(1998). 'How did China Feed itself in the Fast? How will China Feed Itself in the Future?' Second Distinguished Economist Lecture. Mexico, D.D.: CIMMYT.

Lin, J.Y.(1995). 'Endowments, Technology, and Factor Markets: A Natural Experiment of Induced Institutional Innovation From China's Rural Reform.' *American Journal of Agricultural Economics*, 77 (May): 231-242.

Lin, J. Y, Burcroff II, R., and Feder, G.(1993). 'Agricultural Reform in a Socialist Economy: The Experience of China.' In Braverman, A., Brooks, K.M., and Csaki, C.(eds.), *The Agricultural Transition in Central and Eastern Europe and the Former U.S.S.R.* The World Bank, Washington D.C.

Lin, J.Y.(1992). 'Rural Reforms and Agricultural Growth in China.' *American Economic Review*, 82(March):34-51.

Lin, J.Y.(1990). 'Collectivization and China's Agricultural Crisis in 1959-1961.' *Journal of Political Economy*. Vol. 98, No.6.

Lin, J.Y.(1988). 'The Household Responsibility System in China's Agricultural Reform: A Theoretical and Empirical Study.' *Economic Development and Cultural Change* 36 (April), pp s119-s224.

Lin, J. Y.(1987). 'The Household Responsibility System Reform in China: A Peasant's Institutional Choice.' *American Journal of Agricultural Economics*, May, P. 410-415.

Lin, L.P.(1995). 'The Evaluation of Sweetpotato Starch Processing Techniques and Quality.' Annual Project Report to CIP, code: 6203.

Lin, W.L., and Chen, T.P.(1996). *Management of Developing Economies in Transition: choice of methods and techniques in economic reform.* Praeger Publishers.

Loudon, D.L. and Bitta, A.J.D.(1979). *Consumer Behaviour: Concepts and Applications.* McGraw-Hill, Inc.

Luck, D.J., and Rubin, R.S.(1987). *Marketing Research*, 7th ed., Prentice-Hall, Inc.

Luo, S.N., and Li, S.T.,(1995). *Annals of Sichuan Province: Grain Section.* Sichuan Science and Technology Press, China.

Lutz, C.(1994). *The Functioning of the Maize Market in Benin: spatial and temporal arbitrage on the market of a staple food crop.* Dissertation, University of Amsterdam, The Netherlands.

Lutz, C., and Van Tilburg, A.(1997). 'Framework to Assess the Performance of Food Commodity Marketing Systems in Developing Countries with an application to the Maize Market in Benin.' In W.K. Asenso-Okyere, G. Benneh and W, Tims (eds.), *Sustainable Food Security in West Africa*, Dordrecht: Kluwer Academic Publishers.

Madden, T, J., Ellen, P.S., and Ajzen, I.(1992). 'A Comparison of the Theory of Planned Behaviour and the Theory of Reasoned Action,' *Personality and Social Psychology Bulletin*, 18(February, 1), 3-9.

Market Statistical Yearbook of China, (1996). China Statistical Publishing House, Beijing, China, 1997.

Martin, S. (1993). *Advanced Industrial Economics.* Blackwell Publishers.

Mason, J.B., and Ezell, H.F.(1993). *Marketing Management*. New York: MacMillan, Inc.

McMillan, J.(1995): 'Markets in Transition.' Morill Hall: IRIS (Center for Institutional Reform and the Informal Sector) (Working Paper 181)

McNamara, C.P.(1972). 'The Present Status of the Marketing Concept.' *Journal of Marketing*, Vol. 36 (January), pp. 50-57.

Mehrabiann, A., and Russell, J.(1974). *An Approach to Environmental Psychology*, Cambridge, MA: MIT Press..

Mejstrik, M.(ed.). (1997). *The Privatisation Process in East-Central Europe: Evolutionary Process of Czech Privatisation*. Kluwer Academic Publishers.

Meulenberg, M.T.G. (1986). 'The Evolution of Agricultural Marketing Theory: towards better co-ordination with general marketing theory.' *Netherlands Journal of Agricultural Science* 34 301-315.

Meulenberg, M.T.G.(ed.). (1993). *Food and Agribusiness Marketing in Europe*, International Business Press.

Meulenberg, M.T.G., and Kool, M.(1994). 'Chain Marketing of Agricultural Products.' In Hagelaar, G. (ed.). *Management Studies and the Agri-business: Management of Agri-chains*. Proceedings of the First International Congress on Agri-chain Management, Ede, The Netherlands.

Meulenberg, M.T.G.(1996). 'Marketing Organisation, Innovation and Agricultural Cooperatives.' In: G. Galizzi, L. Venturini (eds.) *Economics of Innovation: the case of food industry*. Physica-Verlag, A Springer-Verlag, Heidelberg.

Meulenberg, M.T.G.(1997). 'Evolution of Marketing Institutions: A Channel Approach.' in Wierenga, B., Tilburg, A.V., Grunert, K., Steenkamp, J.-B.E.M., and Wedel, M. (eds.), *Agricultural Marketing and Consumer Behaviour in a Changing World,* Boston: Kluwer Academic Publishers.

Ministry of Agricultural (1989). *The Development Strategy of China Grain*. China Agricultural Press. Beijing, China.

Ministry of Agricultural (1995a*). Chinese Agriculture in Advance: dedication to the 50th anniversary of FAO.*

Ministry of Agricultural (1995, 1996 and 1997). *China Agricultural Development Report*, China Agricultural Press, Beijing, China.

Ministry of Agricultural (1997a). *Five Years Review of Chinese Agriculture, 1992-1997*. Beijing, China Agricultural Press, China.

Ministry of Commerce (1992). *Almanac of China's Commerce*. Beijing, China.

Mittal, B., and Lee, M-S.(1989) 'A Causal Model of Consumer Involvement.' *Journal of Economic Psychology* 10, 363-389.

Nabli, M.K. and Nugent, J.B.(eds.). (1989) *The New Institutional Economics and Economic Development: An Introduction.* North-Holland.

North, D. C.(1990). *Institutions, Institutional Change and Economic Performance,* Cambridge University Press.

North, D. C.(1995). 'The New Institutional Economics and Third World Development.' In Harriss, J., Hunter, J. and Lewis, C.M. (eds.), *The New Institutional Economics and Third World Development.* London: Routledge.

Oates, C. G.(1997). *Introduction to Starch Technology.* Seminar of Starch Processing Technology, Chengdu, Sichuan Academy of Agricultural Science, China.

OECD. (1995). *Review of Agricultural Policies: Poland.* Paris.

OECD. (1997). *Lessons from the Economic Transition: Central and Eastern Europe in the 1990s.* Kluwer Academic Publishers.

Park, A., and Rozelle, S.(1996). 'Commercialisation of the State in Rural China.' Paper presented at the conference on *'Property Rights in Transitional Economies: Insights from Research on China'.* Hong Kong University of Science and Technology, June 13-15.

Peter, J. P. and Olson, J. C.(1993). *Consumer Behavior and Marketing Strategy,* 3rd. ed. IRWIN, INC.

Przepiora, A. and McLeay, F.(1997). 'The Polish Dairy Industry in Transition: Opportunities, Threats and Future Directions.' Paper presented at the 54th EAAE Seminar *'Food Processing and Distribution in Transition Economies: Problems and Properties'*, December 7 to 9, Halle.

Purcell, Wayne D.(1979*).* *Agricultural Marketing: Systems, Coordination, Cash and Futures Prices.* Reston Publishing Company, Inc.

Raju, P.S.(1980). 'Optimum Stimulation Level: Its Relationship to Personality, Demographics, and Exploratory Behaviour.' *Journal of Consumer Research,* vol. 7. Dec.

Reeder, R. R., Brierty, E. G., and Reeder, B.H.(1987). *Industrial Marketing: Analysis, Planning and Control.* Prentice-Hall Inc.

The Research Institute of Development Assistance (RIDA).(1995). *Prospects for Grain Supply-Demand Balance and Agricultural Development Policy in China.* Tokyo, Japan.

Roa, J.R. (1992). 'Market Research in Sweetpotato Food Project in the Philippines.' in: G.Scott et al. (eds.), *Product Development for Root and Tuber Crops*, vol. 1, Asia, P.141-146.

Rozelle, S., Park, A., and Huang, J.K.(1995). 'Dilemmas in Reforming State-Market Relations in Rural China.' Working paper, Food Research Institute, Stanford University.

Rozelle, S., Park, A., Huang J.K., and Jin H.h.(1997). 'Liberalisation and Rural Market Integration in China.' *American Journal of Agricultural Economics* 79(May): 635-642.

Rozelle, S., Park, A., Huang J.K., and Jin H.h.(1998). 'Bureaucrat to Entrepreneur: The Changing Role of the State in China's Grain Economy.' *Economic Development and Cultural Change* (Forthcoming).

Rural Statistical Yearbook of China, (1997), State Statistical Publishing House, Beijing, China.

Scherer, F.M., and Ross, D.(1990). *Industrial Market Structure and Economic Performance*. 3rd. ed. Boston: Houghton Mifflin Company.

Schiffman, L.G., and Kanuk, L.L.(1991). *Consumer Behaviour*. 4th ed. Prentice-Hall International, Inc. Engelwood Cliffs, N. J.

Schmitt, G.(1993). 'Why Collectivisation of Agriculture in Socialist Countries Has Failed: A Transaction Cost Approach.' In C. Csaki and Y. Kislev (eds.), *Agricultural Co-operatives in Transition*, Westview Press.

Sheng, J.N., and Wu, J.W.(1990). *Annals of China Sweetpotato Variety*. China Agricultural Press, Beijing, China.

Sheppard, B.H., Hartwick, J. and Warshaw, P.R. (1988). 'The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research.' *Journal of Consumer Research*, Vol. 15, Dec.

Sosnick, S.H.(1958). 'A Critique of Concepts of Workable Competition.' *Quarterly Journal of Economics*, Vol. 72 (August), pp.380-423.

Wang, S.W., Song, B.F., and Zhang, L.M.(1995). *Status and Prospects of Sweet potato Processing in China*. SAPPRAD workshop paper, Shandong, China.

Sheth, J. N.(1974). *Models of Buyer Behaviour: Conceptual, Quantitative, and Empirical*. Harper & Row, Publisher, Inc., N.Y.

Sheth, J.N., Gardner, G.M., and Garrett, D.E.(1988). *Marketing Theory: Evolution and Evaluation*. John Wiley & Sons, Inc.

Sheth, J.N. and Raju, P.S.(1974). 'Sequential and Cyclical Nature of Information Processing Models in repetitive Choice Behaviour.' *Advances in Consumer Research*, vol.1. 348-358.

Sichuan Statistical Yearbook (1996). Chinese Statistical Publishing House, Beijing, China.

Sichuan Statistical Yearbook of Agricultural and Husbandry (From 1986 to 1996). Department of Agriculturue, Sichuan Provincial Government, China.

Wang, S. D.(ed.) (1982). *Cultivation Study of Chinese Sweetpotato*. Chinese Agricultural Publishing House, Beijing, China.

SPSS Categories 6.1. (1994). SPSS Inc. Chicago, USA.

SPSS Professional Statistics 6.1. (1994). SPSS Inc. Chicago, USA.

Statistical Yearbook of China, (1994). China Statistical Publishing House, Beijing, China.

Steenkamp, J-B. E.M.(1997). 'Dynamics in Consumer Behaviour with Respect to Agricultural and Food Products,' In B. Wierenga, A.van Tilburg, K. Grunert, J.-B.E.M. Steenkamp and M. Wedel (eds.), *Agricultural Marketing and Consumer Behaviour in a Changing World*, Boston: Kluwer Academic Publishers,

Steenkamp, J-B. E.M., and Baumgartner, H.(1995). 'Development and Cross-cultural Validation of a Short Form of CSI as a measure of Optimum Stimulation Level,' *Intern. J. of Research in Marketing*, 1297-104.

Steenkamp, J-B. E.M., and Baumgartner, H.(1992). 'The Role of Optimum Stimulation Level in Exploratory Consumer Behaviour.' *Journal of Consumer Research*, vol. 19. Dec.

Stern, L.W., and El-Ansary, A.I.(1988). *Marketing Channels*, 3rd ed. Prentice-Hall, Englewood Cliffs, NUJ.

Stern, L.W., EL-Ansary, A.I. and Coughlan, A.T. (1996). *Marketing Channels*, 5th ed. Prentice Hall-International, Inc.

Strassmann, W.P.(1987). 'Home-based Enterprises in Cities of Developing Countries.' *Economic Development and Cultural Change*, 36 (October), P.121-143,

Subbarao, K.(1978). *Rice Marketing System and Compulsory Levies in Andhra Pradesh*. Allied Publishers Private Ltd., New Delhi, India.

Taylor, S., and Todd, P.(1995). 'Decomposition and Crossover Effects in the Theory of Planned Behaviour: A Study of Consumer Adoption Intentions.' *Intern. J. of Research in Marketing* 12, 137-155.

Termorshuizen, J.G., Meulenberg, M.T.G., and Wierenga, B.(1986). 'Consumer Behaviour in Respect of Milk in the Netherlands.' *European Review of Agricultural Economics*, 13, 001-022.

Timmer, C. P.(1986). *Getting Prices Right: The Scope and Limits of Agricultural Price Policy*, Cornell University Press.

Timmins, W.H., and Marter, A.D. (1990). 'Sweetpotato Development in China: an investigation in collaboration with CIP.' Project A 0091. Natural Resources Institute. U.K.

Tracy, M.(1993). *Food and Agriculture in a Market Economy: an introduction to theory, practice and policy*. APS-Agricultural Policy Studies, Belgium.

Umali, D.L., Schwartz, L.(1994). 'Public and Private Agricultural Extension: Beyond Traditional Frontiers.' World Bank Discussion Papers, 236.

UPWARD.(1995). *Taking Root*: Proceedings of the Third UPWARD Review and Planning Workshop.

Van Trijp, H. C.M., and Steenkamp J-B. E.M.(1992), 'Consumer's Variety Seeking Tendency with Respect to Food: Measurement and Managerial Implications.' *European Review of Agricultural Economics*, 19, 181-195.

Van Trijp, H. C.M.(1995). *Variety-seeking in Product Choice Behaviour Theory with Application in the Food Domain*. Dissertation, Wageningen Agricultural University, the Netherlands.

Van Trijp, H. C. M., Hoyer, W.D. and Inman, J. J.(1996). 'Why Switch? Product Category-Level Explanations for True Variety-Seeking Behaviour.' *Journal of Marketing Research*, Vol.XXX111 (August), 281-292.

Viaene, J., and Gellynck, X.(1997). 'Competitiveness of the Food and Drink Industry in Poland and Czech Republic.' Presented at the Conference 'Food Processing and Distribution in Transition Economies: Problems and Perspectives', Institute of Agricultural Department in Central and Eastern Europe, Germany.

Watson, G.A., Dimyati, A.(1991). 'Sweetpotato Production, Utilisation and Marketing in Commercial Centres of Production in Java.' *Sweetpotato Cultures of Asia and South Pacific*, Proceedings of the 2nd annual UPWARD International Conference, Laguna, Philippines.

Wierenga, B.(1997). 'Competing for the Future in the Agricultural and Food Channel,' in B. Wierenga, A.van Tilburg, K. Grunert, J.-B.E.M. Steenkamp and M. Wedel (eds.), *Agricultural Marketing and Consumer Behaviour in a Changing World*, Boston: Kluwer Academic Publishers.

Wilkie, W.L.(1986), *Consumer Behaviour*. John Wiley & Sons, Inc.

Williamson, O. E.(1998). 'Transaction Cost Economics: How it works: Where it is headed.' *De Economist*, Volume 146, No.1, p.23-58.

Wittink, D., and Cattin, P.(1989). 'Commercial Use of Conjoint Analysis: An Update.' *Journal of Marketing*, 53 (July), 91-6.

Woolfe, J. (1992). *Sweetpotato: an untapped resource*. Cambridge University Press.

World Bank. (1993). *The Agricultural Transition in Central and Eastern Europe and the Former U.S.S.R.* The World Bank, Washington, D. C.

World Bank. (1994). *China: Internal Market Development and Regulation.* The World Bank, Washington, D.C.

World Bank. (1996). *The Chinese Economy: Fighting Inflation, Deepening Reforms.* The World Bank, Washington, D.C.

Xu, B.Y., and Li, Y.(1997). *Wholesale Marketing Study,* Chinese Agricultural Publishing House, Beijing, China.

Yu, W.(1997). *Marketing Reform and Grain Markets Integration in China.* MSc. thesis. Chinese Academy of Agricultural Sciences. Beijing, China.

Yu, W., and Huang, J.K., (1998). 'Reform and Rural Market Integration in China: a case study of Rice.' *Economic Research Journal.* No. 3 p. 50-58.

Zaichkowsky, J.L.(1985). 'Measuring the Involvement Construct.' *Journal of Consumer Research,* Vol. 12. December.

Zhang, B., and Carter, C.A.(1997). 'Reforms, the Weather, and Productivity Growth in China's Grain Sector.' *American Journal of Agricultural Economics* 79 (November), 1266-1277.

SUMMARY

China's achievements in its reform from a centrally planned economy toward a marketing economy during the last two decades are substantial. Although it still has a long way to go to reach its targeted aims, half of China's economy is now 'marketised, or is responsive to market forces (Lawrence, 1998). The influence of the transition on agricultural marketing is significant, particularly when the reforms were initiated by farmers and started in rural areas. The sweetpotato sector, one of the earlier crops to move away from centrally controlled planning, is particularly suitable for a transitional marketing study. Sichuan is chosen as the study area since it is the largest sweetpotato producing and processing province in China. This study investigates the role of agricultural marketing in a transitional economy and how agricultural marketing functions in a transitional economy in terms of market structure, market institutions and market orientation.

After an introduction about the research objectives in the first chapter, relevant aspects of the theory of Institutional Economics are applied to agricultural marketing in China's transitional economy in chapter 2. Using a framework of New Institutional Economics as discussed by Williamson (1998), we focus on getting the institutional environment right and getting the governance structure right. The institutional environment is concerned with the rules of the game while the governance structure concerns the actual play of the game. Institutional environment changes in China's agricultural marketing started in 1978 with the advent of new agricultural institutions: the Household Responsibility System (HRS), which replaced the central planning authority. It was then followed by both deregulation of agricultural production and price liberalisation. These transformations abolished the rigid central planning system and redefined the rules of the marketing game. As the institutional environment changed, the corresponding government structure also had to be adjusted, particularly for the traditional marketing institutions, such as the Grain Bureau and Supply and Marketing Co-operatives. The new institutional environment not only required the transformation of the traditional government controlled marketing institutions, but also called for new marketing institutions, such as open markets, wholesale markets and so on.

Chapter 3 is devoted to the sweetpotato economy in Sichuan Province from a historical perspective: how sweetpotato production, processing and marketing have changed during the 20th century. At the beginning of this century, sweetpotatoes were mainly used as a staple food for fresh consumption. Processing and marketing of sweetpotato was constrained by the presence of a subsistence economy in that period. After the communist took over power in 1949, sweetpotato production in Sichuan Province was greatly increased in order to meet the rising demand for food. As a Category 1 crop, sweetpotato production, processing and marketing were strictly controlled by the government. Private sector involvement in sweetpotato processing and marketing was forbidden. At the end of the 1970s, beginning with the introduction of the Household Responsibility System and the deregulation of agricultural production, sweetpotato, a less important crop compared with rice and wheat, enjoyed an earlier start towards the market economy. The main benefits farmers gained from the economic reform were due to the liberalisation policy towards sweetpotato processing and marketing. The government policy of sweetpotato processing has changed from 'forbidden' (before the reform), to 'allowed' (beginning of the reform) and finally to 'encouraged' (currently).

In order to investigate the evolution of sweetpotato marketing in a transitional economy, we have analysed consumer behaviour, and the structure and functioning of marketing channels. These are crucial factors in the change of marketing from a planned towards a market economy. Surveys were executed, including two structured questionnaires, one for processing households and one for individual consumers in two counties and one city of the province Sichuan. Unstructured interviews were conducted with actors in the sweetpotato industry, including government officers, crop breeders, processing experts, and market actors (wholesalers, retailers and collectors). The questionnaire design, sampling and data collection procedures are discussed in Chapter 4.

Sweetpotato noodle consumption is investigated on the basis of a consumer behaviour model. It is assumed that consumer choice is influenced by three sets of characteristics: individual characteristics, product-related characteristics and environmental characteristics. A series of variables are defined for each of the three sets and a number of hypotheses based on the specified variables are formulated. Is noodle consumption significantly influenced by attitude and by relevant demographic

variables? The test result shows a significant relationship between attitude and noodle consumption.

We also have studied the impact of a number perceptual variables on noodle consumption. Fifteen perceptual variables are reduced by factor analysis to four factors labelled 'convenience', 'market situation', 'sensory quality' and 'image'. Regression of consumers' noodle consumption on these four factors and on relevant demographic variables shows that 'convenience' and 'market situation' are significant in influencing consumers' noodle consumption. Noodle consumption was also regressed on six important perceptual variables selected on the basis of the importance of their factor loadings. It appears that 'packaging' is the most significant variable in influencing consumers' noodle consumption. Other significant variables include market distance, noodle elasticity and noodle nutritional value. However, no significant relationships are found for demographic variables, such as age, income, region and household size.

We have further investigated whether variety seeking is important for noodle consumption. Several results show that variety seeking in general does not significantly influence noodle consumption. However, additional tests show that urban consumers have a higher variety-seeking tendency than rural consumers, and that younger, more highly educated and higher income consumers also have a higher variety-seeking tendency than lower ones.

Consumers' preference with respect to sweetpotato noodles is analysed using Conjoint analysis. Four attributes (noodle colour, noodle shape, noodle packaging and price) are used to profile noodle products. The results show that 'price' is the most important attribute while 'noodle colour' is the least important. There is a preference difference for noodle packaging between rural consumers and urban consumers. Urban consumers value 'packaging' more than rural consumers do.

So it appears that marketers in the sweetpotato economy in transition will have to pay serious and long-term attention to efficiency of production and marketing in order to keep prices competitive. In addition, they can serve consumers better by improving packaging, nutritional value (no white colour), access to markets and sensory properties. Clearly, the marketing system should adapt in order to serve consumers' needs. Consequently the structure and performance of the marketing system is analysed in Chapter 7 and 8.

In Chapter 7, the structure of the sweetpotato marketing system is discussed. This includes all market actors (producers/processors, collectors, wholesalers and retailers) in the sweetpotato sector and their external environment, such as government, R&D institutions, competitors, consumers and others. The rising number of sweetpotato processors, newly emerged noodle collectors, wholesalers and retailers characterise the transition from a centrally planned to a market economy. These new marketing actors actively carry out different marketing functions, such as buying and selling, transportation, storage and processing. Less attention is paid to the facilitating functions, particularly standardisation, grading and marketing information. Another feature of the sweetpotato market in transition is the change of co-ordination mechanisms in the market channel. Co-ordination by government policy is replaced by the conventional marketing channel, whose functions are mainly co-ordinated by market price. In some cases, further co-ordination by administrative procedures can be observed. Sometimes, they are strengthened by family links between actors in the market channels. The external environment of the sweetpotato industry is also described, particularly the relevant R&D institutions and government organisations. Finally, the competitive position of sweetpotato processing in Sichuan is analysed vis à vis Shandong's sweetpotato industry, using Porter's 'diamond' model as a framework. It is concluded that the Sichuan sweetpotato industry is competitive in the domestic Chinese market, but that Shandong has a transport advantage in exporting to Japan and South Korea.

The marketing performance of the sweetpotato industry is analysed on effectiveness and efficiency. The assessment of service outputs of the marketing channels suggests that some aspects of distribution outlets for sweetpotato noodles are less effective than those for other types of noodles. Consumers have to travel a longer distance to purchase sweetpotato noodles, which are offered almost exclusively at open markets. Also, the product is not always available.

Since wholesalers play very important roles in the market channel, their market performances are investigated. Three wholesalers deemed typical for small, medium and large-scale wholesalers were analysed with respect to profitability and marketing efficiency. The results show that wholesalers' profit margins vary considerably. Large-scale wholesalers seem to enjoy economies of scale and to make better use of storage capacity than the small ones, which contributes to a higher profit margin. So

it might be expected that in the further transition toward a market economy, wholesalers will become bigger.

An investigation is also made of which factors enhance integration of noodle processing households into the markets. In this analysis, two groups were first determined by cluster analysis, Cluster 1 being more market integrated and Cluster 2 less market integrated. Compared with Cluster 2, processors in Cluster 1 purchase more starch for noodle processing purposes. They also tend to have long term relationships with traders, do more business with wholesalers and search for more information for price setting. Results from logistic regression show that more educated processors and processors from regions with well-organised markets (e.g. Anyue) have a higher probability of being more integrated in the markets.

Changes of marketing channels in a transitional economy contribute directly to marketing effectiveness and efficiency. They also contribute indirectly to the rural economy as a whole. This topic is analysed from the point of view of employment generation, income generation and sweetpotato utilisation. The impact on employment is two sided. On the one hand a market economy enhanced by a more effective and efficient marketing system brings new problems, such as unemployment and reallocation of millions of laid-off rural labourers. On the other hand, new opportunities and demand for more labour are created. Generating new employment is one of the contributions of the expansion of sweetpotato-processing activities.

The results of our study are integrated in Chapter 9 using the concept of market orientation (Kohli and Jaworski, 1990). The three dimensions of market orientation: market intelligence generation, dissemination and responsiveness, also seem key dimensions to be considered in changing marketing policies and marketing structures in the transition from a planned to a market economy. Firstly, it appears that consumers' preference and perception are not well understood by marketers (e.g. noodle packaging and noodle colour), and consumers' wants and needs are not always served well because of too great market distance and product unavailability. A market intelligence system at the industry level will have to assist market orientation, since most actors (individual farmers) are still too small to bear the costs of a market intelligence system at the company level. Also, effective dissemination of market intelligence will have to be handled at the industry level in addition to information flows generated by individual actors, such as wholesalers.

The responsiveness of the sweetpotato market system to the generated intelligence has to be handled carefully in order to establish effective channels. Effective response to market intelligence will remain difficult for individual households yet because of the small company size, e.g. product development is too expensive. Co-ordination of activities, like by co-operatives, as well as market-oriented government research on product development are still important for a smooth transition of agricultural marketing systems entering into an open market economy.

SAMENVATTING[7]

Gedurende de afgelopen twee decennia heeft China substantiële vorderingen gemaakt in de hervorming van een centraal geleide economie naar een markt economie. Hoewel er nog steeds een lange weg te gaan is, is de helft van China's economie *"marketised, or ... responsive to market forces"* (Lawrence 1998). De transitie heeft een significante invloed op de agrarische marketing, met name omdat veel hervormingen geïnitieerd zijn door boeren, en begonnen zijn op het platteland. De zoete aardappel sector was een van de eerste sectoren die zich los wist te maken van de centraal geleide economie, en is daarom bij uitstek geschikt voor het bestuderen van markthervormingen. Als onderzoeksgebied is gekozen voor Szechuan, omdat deze provincie de grootste producent en verwerker is van zoete aardappelen in China. Deze studie onderzoekt de rol van de agrarische marketing binnen een economie in transitie met betrekking tot marktstructuur, marktinstituties, en marktoriëntatie.

Nadat het doel van dit onderzoek is omschreven in hoofdstuk 1, worden in hoofdstuk twee relevante onderdelen van de theorie van de institutionele economie toegepast op agrarische marketing in de Chinese economie in transitie. We maken hier gebruik van het raamwerk van de nieuwe institutionele economie (Williamson 1998), en richten ons op het instellen van de institutionele omgeving en de besturingsstructuur. De institutionele omgeving heeft betrekking op de "regels van het spel", en de besturingsstructuur heeft betrekking op het daadwerkelijk "spelen van het spel". De eerste veranderingen in de institutionele omgeving van de agrarische marketing in China vonden plaats in 1978, toen het centrale planorgaan vervangen werd door het Systeem van Huishoudelijke Verantwoordelijkheid (SHV). Dit werd gevolgd door prijsliberalisatie en deregulering van agrarische productie. Deze veranderingen maakten een eind aan het starre centraal geleide systeem, en betekenden een ommekeer in de regels van het marketing "spel". De veranderingen in de institutionele omgeving maakten het noodzakelijk dat de bijbehorende besturingsstructuur aangepast diende te worden. Dit gold met name voor traditionele marketing instituten als het Graanbureau en de marketing coöperaties. De nieuwe institutionele omgeving vereiste niet alleen de hervorming van de traditionele, door de

---

[7] The Author gratefully acknowledges Ir. Peeter Verlegh's Dutch Translation.

overheid geleide, marketing instituties, maar ook het ontstaan van nieuwe marketing instituties, zoals open markten en groothandels markten.

Hoofdstuk drie plaatst de zoete aardappel economie in de Szechuan provincie in een historisch perspectief: er wordt beschreven hoe de productie, verwerking en vermarkting van zoete aardappels veranderd zijn gedurende de 20e eeuw. In het begin van deze eeuw werden zoete aardappelen voornamelijk gebruikt als basisvoedsel voor directe consumptie. Gedurende deze periode werd het verwerken en vermarkten van de zoete aardappel beperkt door de heersende economie van zelfvoorziening. Nadat de communisten in 1949 de macht overnamen, werd de productie van zoete aardappelen in de provincie Szechuan sterk opgevoerd, zodat men tegemoet kon komen aan de groeiende vraag naar voedsel. De zoete aardappel werd een "categorie I" gewas, wat inhield dat de productie, verwerking en vermarkting volledig gecontroleerd werd door de regering. De betrokkenheid van de private sector bij de vermarkting en verwerking van zoete aardappelen was niet toegestaan. In China is de zoete aardappel minder belangrijk dan rijst en tarwe, en dit heeft er toe bijgedragen dat het gewas een vroege start kende in de overgang naar een markteconomie. De eerste stappen in dit proces bestonden uit de invoering van het Systeem van Huishoudelijke Verantwoordelijkheid en de deregulering van agrarische productie aan het eind van de jaren zeventig. Het belangrijkste voordeel van de hervormingen voor de boeren kon worden toegeschreven aan de liberalisatie van de verwerking en vermarkting van zoete aardappelen. Het overheidsbeleid met betrekking tot de verwerking van de zoete aardappel veranderde van "verboden" (voor de hervormingen) naar "toegestaan" (aan het begin van de hervormingen). Tegenwoordig wordt de verwerking zelfs aangemoedigd door de overheid.

Om de evolutie van de marketing van zoete aardappelen in een economie in transitie te bestuderen, hebben we het consumentengedrag geanalyseerd. Tevens hebben we een studie gemaakt van de structuur en het functioneren van distributiekanalen. Dit zijn cruciale factoren in de overgang van marketing in een planeconomie naar marketing in een markteconomie. Er werden twee enquêtes uitgevoerd met behulp van een gestructureerde vragenlijst. De eerste werd afgenomen onder huishoudens die zoete aardappelen verwerken, de tweede werd afgenomen onder individuele consumenten in twee districten en een stad in Szechuan. Daarnaast zijn er open interviews gehouden met actoren in de zoete aardappel industrie, waaronder ambtenaren, telers, verwerkingsexperts en marktactoren (groothandelaren,

detailhandel en inkopers). De opzet van de vragenlijst, de steekproef en de procedure voor dataverzameling worden besproken in hoofdstuk vier.

De consumptie van zoete aardappel *noedels* is onderzocht aan de hand van een model van hat consumentengedrag. Er is aangenomen dat de keuze van consumenten beïnvloed word door drie groepen karakteristieken, die betrekking hebben op het individu, op het product en op de omgeving. Voor elk van de drie groepen is er een reeks van variabelen gedefinieerd, en er is een aantal hypotheses geformuleerd dat betrekking heeft op deze variabelen. Wordt de consumptie van zoete aardappel noedels significant beïnvloed door attitude en relevante demografische karakteristieken? De resultaten laten zien dat er een significant verband bestaat tussen attitude en de consumptie van noedels.

Er is tevens onderzoek gedaan naar de invloed van een aantal perceptuele variabelen op de consumptie van noedels. Met behulp van factoranalyse zijn 15 variabelen gereduceerd tot vier factoren, te weten, "gemak", "marktsituatie", "sensorische kwaliteit" en "imago. Een regressie van noedel consumptie op deze vier factoren en relevante demografische kenmerken laat zien dat "gemak" en "marktsituatie" een significant effect hebben op de consumptie van noedels. De consumptie van noedels is tevens geregresseerd op een zestal perceptuele variabelen, die geselecteerd zijn op basis van de grootte van de bijbehorende factorladingen. Het blijkt dat "verpakking" de meest significante invloed heeft op de consumptie van noedels. Andere significante variabelen zijn de afstand tot de markt, de elasticiteit van de noedels, en de voedingswaarde van de noedels. Geen significante effecten werden gevonden voor demografische kenmerken als leeftijd, inkomen, regio en huishoudgrootte.

Er is tevens onderzocht of variatiezoekgedrag een belangrijke rol speelt bij de consumptie van noedels. De resultaten laten zien dat variatiezoekgedrag geen significante invloed heeft op de consumptie van noedels. Additionele analyses laten zien dat consumenten in de steden een grotere variatiegeneigdheid vertonen dan consumenten op het platteland en dat variatiegeneigdheid hoger is onder jongere, hoger opgeleide consumenten met hogere inkomens.

De preferenties van consumenten ten aanzien van zoete aardappel noedels werd onderzocht met behulp van conjunct meten. Vier attributen (kleur, vorm, verpakking en prijs) zijn gebruikt om een aantal noedel-productprofielen te genereren. De resultaten laten zien dat "prijs" het belangrijkste attribuut is, en dat "kleur" het minst

belangrijk is. Voor "verpakking" werd een verschil in preferentie gevonden tussen consumenten op het platteland en in de steden. De laatste groep hecht meer waarde aan verpakking.

Het lijkt er dus op dat ondernemers in de zoete aardappel economie in transitie serieus en langdurig aandacht dienen te besteden aan de efficiëntie van productie en marketing, zodat hun prijzen concurrerend blijven. Daarnaast kunnen zij consumenten beter bedienen door het verbeteren van de toegang tot markten, en van de verpakking, voedingswaarde (geen witte kleur) en sensorische eigenschappen van de noedels. Het is duidelijk dat het marketingsysteem aangepast moet worden zodat men beter tegemoet kan komen aan de wensen van de consument. Dit brengt ons tot de analyse van de structuur en prestatie van het marketingsysteem, die besproken wordt in hoofdstukken 7 en 8.

In hoofdstuk 7 wordt de structuur van het marketingsysteem voor zoete aardappelen besproken. Er wordt aandacht besteed aan alle marktactoren (producenten/verwerkers, inkopers, groothandelaren en detailhandel) in de zoete aardappel sector. Tevens wordt er gekeken naar de externe omgeving, waaronder de overheid, onderzoeks- en ontwikkelingsinstituten, concurrenten en consumenten. Het toenemende aantal verwerkers van zoete aardappelen, en de recente opkomst van noedel inkopers, groothandelaren en detailhandel kenmerken de overgang van een centrale planeconomie naar een markteconomie. Deze nieuwe marketing actoren zijn actief in de uitvoering van verschillende marketingfuncties, als kopen en verkopen, distributie, opslag en verwerking. Minder aandacht wordt besteed aan faciliterende functies, zoals (met name) standaardisatie, classificatie, en marktinformatie. Een ander kenmerk van de zoete aardappel markt in transitie is de verandering in de coördinatie mechanismen in het afzetkanaal. De coördinatie door middel van overheidsbeleid is vervangen door het conventionele distributiekanaal, waarvan de functies voornamelijk gecoördineerd worden door de marktprijs. In sommige gevallen is er een additionele coördinatie door middel van informele bestuurlijke procedures. Deze vorm van coördinatie wordt vaak versterkt door de aanwezigheid van familiebanden tussen de actoren in het kanaal. De externe omgeving van de zoete aardappel industrie wordt ook beschreven, waarbij met name aandacht wordt besteed aan de relevante onderzoeks- en ontwikkelingsinstituten en overheidsorganisaties. Tot slot wordt, met behulp van de "diamant" van Porter, een vergelijking gemaakt tussen de concurrentieposities van de verwerkingsindustrieën voor zoete aardappelen in

Szechuan en in Shandong. Er wordt geconcludeerd dat de zoete aardappel industrie in de provincie Szechuan een sterke positie heeft in de Chinese markt, maar dat de industrie in Shandong een distributievoordeel heeft bij de uitvoer naar Japan en Zuid Korea.

De marketingprestatie van de zoete aardappel industrie is onderzocht op effectiviteit en efficiëntie. Een bepaling van het niveau van de geleverde diensten door de verschillende distributiekanalen suggereert dat een aantal aspecten van de afzetmarkten voor zoete aardappel noedels minder effectief zijn dan vergelijkbare aspecten voor andere typen noedels, zoals tarwe noedels. Consumenten moeten een grotere afstand afleggen voordat zij zoete aardappel noedels kunnen kopen, omdat deze vrijwel uitsluitend geleverd worden in open markten. Bovendien is het product niet altijd beschikbaar.

De marktprestatie van groothandelaren is onderzocht omdat zij een zeer belangrijke rol spelen in het distributiekanaal. Er is een analyse gemaakt van de rentabiliteit en efficiëntie van drie groothandelaren, die kleine, middelgrote en grote handelsorganisaties representeren. De resultaten laten zien dat er substantiële verschillen zijn in de winstmarges van deze handelaren. Grootschalige handelaren kunnen profiteren van schaalvoordelen en kunnen hun opslagcapaciteit beter benutten dan kleinere handelaren. Dit resulteert in een grotere winstmarge. Er mag daarom verwacht worden dat de schaal van groothandelaren zal toenemen bij een verdere transitie richting markteconomie.

Er is tevens onderzoek gedaan naar de factoren die een positieve invloed hebben op de integratie in de markt van noedel verwerkende huishoudens. Voor dit onderzoek werden allereerst twee groepen bepaald met behulp van clusteranalyse, waarbij Cluster 1 meer marktgeïntegreerd was dan Cluster 2. Verwerkers in cluster 1 kopen meer zetmeel voor de verwerking van noedels dan verwerkers in cluster 1. Daarnaast hebben de verwerkers in cluster 1 lange termijn relaties met handelaren, doen zij vaker zaken met groothandelaren en zoeken zij meer informatie ten behoeve van hun prijsbepaling. Een logistische regressie laat zien dat hoger opgeleide verwerkers, en verwerkers uit goed georganiseerde markten als Anyue, hebben een grotere kans dat zij meer geïntegreerd zijn in de markten.

Veranderingen binnen distributiekanalen in een economie in transitie dragen rechtstreeks bij aan de effectiviteit en efficiëntie van vermarkting. Daarnaast leveren zij een indirecte bijdrage aan de rurale economie als geheel. Dit aspect is bestudeerd

vanuit het oogpunt van het creëren van arbeid, het genereren van inkomen en het gebruik van de zoete aardappel. De invloed op arbeid is tweeledig. Enerzijds brengt een markteconomie, dankzij haar efficiënte en effectieve marketing systeem, nieuwe problemen met zich mee, zoals werkeloosheid en de herplaatsing van miljoenen voormalige plattelandsarbeiders. Anderzijds worden er nieuwe mogelijkheden en een nieuwe vraag naar arbeid gecreëerd. Het creëren van nieuwe arbeid is een van de positieve gevolgen van de uitbreiding van de activiteiten met betrekking tot de verwerking van zoete aardappelen.

In hoofdstuk 9 worden de resultaten van ons onderzoek geïntegreerd aan de hand van het marktoriëntatie concept van Kohli en Jaworski (1990). De overgang van planeconomie naar markteconomie vraagt om veranderingen in structuur en beleid op het gebied van afzet en distributie. De drie dimensies van markoriëntatie, te weten het genereren, verspreiden en reageren op marktinformatie, spelen hierbij een belangrijke rol. Het lijkt erop dat de marketer onvoldoende inzicht heeft in de preferenties en percepties van de consument, bijvoorbeeld met betrekking tot de verpakking en kleur van de noedels. De consument wordt vaak onvoldoende bediend, omdat de markt zich bevindt op een te grote afstand, en omdat de producten vaak niet beschikbaar zijn. De marktoriëntatie dient te worden ondersteund door een marktinformatie systeem op het niveau van de gehele bedrijfstak, omdat het merendeel van de actoren bestaat uit individuele boeren, waardoor het uit financieel oogpunt onmogelijk is om een dergelijk systeem te realiseren op het niveau van individuele bedrijven. Om dezelfde reden is het noodzakelijk dat er een effectieve verspreiding van marktinformatie gerealiseerd wordt op het niveau van de gehele bedrijfstak, in aanvulling op de reeds bestaande informatiestromen vanuit individuele actoren (bijvoorbeeld groothandelaren).

Om te komen tot effectieve distributiekanalen is het belangrijk dat er het marktsysteem voor zoete aardappelen zorgvuldig gebruik maakt van de gegenereerde marktinformatie. Vanwege de geringe bedrijfsgrootte zal het voor individuele huishoudens moeilijk blijven om op effectieve wijze te reageren op marktinformatie, bijvoorbeeld door produktontwikkeling. Voor een soepele transitie van het agrarische marketing systeem blijft het daarom van groot belang dat er coördinatie plaatsvindt van de activiteiten van de verschillende actoren, bijvoorbeeld door coöperaties. Hierin is tevens een rol weggelegd voor de overheid, bijvoorbeeld in de uitvoering van marktgeoriënteerd onderzoek.